DOCUMENT RESUME

ED 038 405 | 24 | TE 001 784

AUTHOR	Harris, Margaret L.
TITLE	A Factor Analytic Study of the Wisconsin Tests of Testimony and Reasoning Assessment (WISTTRA). Report from Concepts in Verbal Argument Project.
INSTITUTION	Wisconsin Univ., Madison. Research and Development Center for Cognitive Learning.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.
REPORT NO	TR-100
BUREAU NO	BR-5-0216
PUB DATE	Oct 69
CONTRACT	OEC-5-10-154
NOTE	54p.
EDRS PRICE	EDRS Price MF-$0.25 HC-$2.80
DESCRIPTORS	*Cognitive Tests, *Critical Thinking, Factor Analysis, Taxonomy, Test Construction, Testing Problems, *Test Reliability, *Test Validity, *Verbal Communication, Verbal Tests
IDENTIFIERS	*Wisconsin Tests Testimony Reasoning Assessment, WISTTRA

ABSTRACT

Speech specialists have developed a taxonomy of concepts and abilities related to verbal argument as used in ordinary discourse. This study represents one possible step in the validation of that taxonomy: an evaluation of the Wisconsin Tests of Testimony and Reasoning Assessment (WISTTRA) and the underlying abilities or dimensions measured by them. It is, thus, a study of the construct validity of the concepts and abilities of verbal argument defined by Allen, Feezel, and Kauffeld (See ED 016 658). Data from over 1200 students were subjected to reliability estimation and factor analysis. Both derived orthogonal and derived oblique factor solutions were obtained for each of three initial factor methods. The major conclusion is that the tests based upon the taxonomy have construct validity at a particular level of specificity. This level is the specific internal (accept and reject) and external (consistency, recency, and proximity) tests used in assessing testimony and the four argument components for reasoning. (See also ED 036 521 and TE 001 783.) (Author/LH)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED038405

Technical Report No. 100

A FACTOR ANALYTIC STUDY OF THE WISCONSIN TESTS OF TESTIMONY AND REASONING ASSESSMENT (WISTTRA)

By Margaret L. Harris

Report from Concepts in Verbal Argument Project
R. R. Allen, Principal Investigator

and the

Technical Section
Mary R. Quilling, Director

Wisconsin Research and Development
Center for Cognitive Learning
The University of Wisconsin
Madison, Wisconsin

October 1969

TE 001 784

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education, and Welfare. The opinions expressed herein do not necessarily reflect the position or policy of the Office of Education and no official endorsement by the Office of Education should be inferred.

Center No. C-03 / Contract OE 5-10-154

NATIONAL EVALUATION COMMITTEE

Samuel Brownell
Professor of Urban Education
Graduate School
Yale University

Launor F. Carter
Senior Vice President on Technology and Development
System Development Corporation

Francis S. Chase
Professor
Department of Education
University of Chicago

Henry Chauncey
President
Educational Testing Service

Martin Deutsch
Director, Institute for Developmental Studies
New York Medical College

Jack Edling
Director, Teaching Research Division
Oregon State System of Higher Education

Elizabeth Koontz
President
National Education Association

Roderick McPhee
President
Punahou School, Honolulu

G. Wesley Sowards
Director, Elementary Education
Florida State University

Patrick Suppes
Professor
Department of Mathematics
Stanford University

***Benton J. Underwood**
Professor
Department of Psychology
Northwestern University

UNIVERSITY POLICY REVIEW BOARD

Leonard Berkowitz
Chairman
Department of Psychology

Archie A. Buchmiller
Deputy State Superintendent
Department of Public Instruction

***James W. Cleary**
Vice Chancellor for Academic Affairs

Leon D. Epstein
Dean
College of Letters and Science

John Guy Fowlkes
Director
Wisconsin Improvement Program

Robert E. Grinder
Chairman
Department of Educational Psychology

H. Clifton Hutchins
Chairman
Department of Curriculum and Instruction

Clauston Jenkins
Assistant Director
Coordinating Committee for Higher Education

Herbert J. Klausmeier
Director, R & D Center
Professor of Educational Psychology

Donald J. McCarty
Dean
School of Education

Ira Sharkansky
Associate Professor of Political Science

Henry C. Weinlick
Executive Secretary
Wisconsin Education Association

M. Crawford Young
Associate Dean
The Graduate School

EXECUTIVE COMMITTEE

Edgar F. Borgatta
Brittingham Professor of Sociology

Max R. Goodson
Professor of Educational Policy Studies

Russell J. Hosler
Professor of Curriculum and Instruction and of Business

***Herbert J. Klausmeier**
Director, R & D Center
Professor of Educational Psychology

Wayne Otto
Professor of Curriculum and Instruction (Reading)

Robert G. Petzold
Associate Dean of the School of Education
Professor of Curriculum and Instruction and of Music

Richard L. Venezky
Assistant Professor of English and of Computer Sciences

FACULTY OF PRINCIPAL INVESTIGATORS

Ronald R. Allen
Associate Professor of Speech and of Curriculum and Instruction

Vernon L. Allen
Associate Professor of Psychology
(On leave 1968-69)

Nathan S. Blount
Associate Professor of English and of Curriculum and Instruction

Robert C. Calfee
Associate Professor of Psychology

Robert E. Davidson
Assistant Professor of Educational Psychology

Gary A. Davis
Associate Professor of Educational Psychology

M. Vere DeVault
Professor of Curriculum and Instruction (Mathematics)

Frank H. Farley
Assistant Professor of Educational Psychology

John Guy Fowlkes (Advisor)
Professor of Educational Administration
Director of the Wisconsin Improvement Program

Lester S. Golub
Lecturer in Curriculum and Instruction and in English

Max R. Goodson
Professor of Educational Policy Studies

Warren O. Hagstrom
Professor of Sociology

John G. Harvey
Associate Professor of Mathematics and Curriculum and Instruction

Herbert J. Klausmeier
Director, R & D Center
Professor of Educational Psychology

Burton W. Kreitlow
Professor of Educational Policy Studies and of Agricultural and Extension Education

Richard G. Morrow
Assistant Professor of Educational Administration

Wayne Otto
Professor of Curriculum and Instruction (Reading)

Milton O. Pella
Professor of Curriculum and Instruction (Science)

Thomas A. Romberg
Assistant Professor of Mathematics and of Curriculum and Instruction

Richard L. Venezky
Assistant Professor of English and of Computer Sciences

MANAGEMENT COUNCIL

***Herbert J. Klausmeier**
Director, R & D Center
Acting Director, Program 1

Mary R. Quilling
Director
Technical Section

Thomas A. Romberg
Director
Programs 2 and 3

James E. Walter
Director
Dissemination Section

Dan G. Woolpert
Director
Operations and Business

* COMMITTEE CHAIRMAN

STATEMENT OF FOCUS

The Wisconsin Research and Development Center for Cognitive Learning focuses on contributing to a better understanding of cognitive learning by children and youth and to the improvement of related educational practices. The strategy for research and development is comprehensive. It includes basic research to generate new knowledge about the conditions and processes of learning and about the processes of instruction, and the subsequent development of research-based instructional materials, many of which are designed for use by teachers and others for use by students. These materials are tested and refined in school settings. Throughout these operations behavioral scientists, curriculum experts, academic scholars, and school people interact, insuring that the results of Center activities are based soundly on knowledge of subject matter and cognitive learning and that they are applied to the improvement of educational practice.

This Technical Report is from the Concepts in Verbal Argument Project in Program 2. General objectives of the Program are to establish rationale and strategy for developing instructional systems, to identify sequences of concepts and cognitive skills, to develop assessment procedures for those concepts and skills, to identify or develop instructional materials associated with the concepts and cognitive skills, and to generate new knowledge about instructional procedures. Contributing to these Program objectives, the staff of the project developed a semiprogramed course in verbal argument and related tests for use at the high school level. The project staff prepared the materials on the basis of an outline of concepts and critical skills developed from an evaluation of everyday discourse.

CONTENTS

		Page
	List of Tables and Figures	vii
	Abstract	ix
I	Introduction	1
	Hypothesized Factor Structures	1
II	Procedures	5
	Subjects	5
	Data Collection	5
	Treatment of Data	5
III	Results and Discussion	7
	Reliability Estimates	7
	Factor Analyses	7
IV	Conclusions	35
	References	37

LIST OF TABLES AND FIGURES

Table		Page
1	Categorization of WISTTRA Subtests According to the Hypothesized Factor Structures	4
2	Means, Standard Deviations, and Reliability Estimates for Males and Females in Grades 8, 10, and 12	8
3	Intercorrelations of WISTTRA Subtests for Grade 8 Males	9
4	Intercorrelations of WISTTRA Subtests for Grade 8 Females	10
5	Intercorrelations of WISTTRA Subtests for Grade 10 Males	11
6	Intercorrelations of WISTTRA Subtests for Grade 10 Females	12
7	Intercorrelations of WISTTRA Subtests for Grade 12 Males	13
8	Intercorrelations of WISTTRA Subtests for Grade 12 Females	14
9	Numbers of Initial and Derived Factors for Males and Females in Grades 8, 10, and 12	15
10	Factor Results for Grade 8 Males	16
11	Factor Results for Grade 8 Females	18
12	Factor Results for Grade 10 Males	21
13	Factor Results for Grade 10 Females	23
14	Factor Results for Grade 12 Males	25
15	Factor Results for Grade 12 Females	28
16	A Comparison of the Comparable Common Factors for the Six Groups	31
17	Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 8	33
18	Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 10	33
19	Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 12	34

Figure

1	Hypothesized Factor Structures	2

ABSTRACT

Subject matter specialists in speech developed a taxonomy of concepts and abilities related to verbal argument as used in ordinary discourse. It was the purpose of this study to use data collected to assess these hypothesized abilities to determine, using factor analytic procedures, the construct validity of the taxonomy.

Both derived orthogonal and derived oblique factor solutions were obtained for each of three initial factor methods—Alpha, Harris R-S^2, and UMLFA. The results for the six different solutions were compared and the comparable common factors, those that are robust over solutions, were determined.

The major conclusion is that the tests based upon the taxonomy of concepts and abilities related to verbal argument as proposed by Allen, Feezel, and Kauffeld (1967) have construct validity at a particular level of specificity. This level is the specific internal and external tests used in assessing testimony and the four argument components for reasoning.

I
INTRODUCTION

This study represents one possible step in the validation of the taxonomy of concepts and critical abilities related to the evaluation of verbal argument proposed by Allen, Feezel and Kauffeld (1967). Based upon this taxonomy, a battery of tests was developed to measure student mastery of these hypothesized critical abilities related to the evaluation of verbal argument used in ordinary discourse. The development of these tests, the Wisconsin Tests of Testimony and Reasoning Assessment (WISTTRA), is discussed by Allen, Feezel, Kauffeld, and Harris (1969). The tests can be found in Allen, Feezel, and Kauffeld (1969).

The tests in the WISTTRA battery were constructed to measure the behaviors related to the fundamental concepts of verbal argument outlined in the taxonomy. Content validity can be claimed as the skills required to correctly respond to the items are those behaviors that were defined by the concepts and abilities related to verbal argument. The purpose of this study is to determine, using factor analytic procedures, the underlying abilities or dimensions measured by WISTTRA. It is, thus, a study of the construct validity of the concepts and abilities of verbal argument defined by Allen, Feezel, and Kauffeld (1967). A schema including different levels of specificity has been identified. If the factor analytic structure obtained is congruent with any level of this schema, this is regarded as evidence of construct validity for that level of the schema.

HYPOTHESIZED FACTOR STRUCTURES

Based upon the concepts and abilities of verbal argument identified, alternative sets of factors were postulated to serve as a guide in the development of the tests. These hypothesized factor structures are diagrammed in Figure 1 and will be discussed in terms of the most general hypothesis to the most specific hypotheses.

The most general hypothesis is that just one common factor or ability underlies the identified concepts and abilities of verbal argument. Next in the order of generality to specificity is the hypothesis that two underlying abilities are present: the ability to evaluate instances of testimony and the ability to evaluate arguments developed through reasoning.

Evaluation of testimony may consist of two or more distinct abilities: the ability to detect instances which violate internal tests of testimony and the ability to detect instances which violate external tests of testimony, or each of these two may be further broken down. Internal tests of testimony might be specific to acceptable and rejectable instances. The latter may be further specific to four different concepts which form the basis for rejection—bias, position to observe, ability to observe, and qualification for judging on the part of the person making the testimonial. External tests of testimony might be specific as to the proximity of the source to the observation reported: primary, as compared with secondary, testimony; to the recency of the testimony: recent, as compared with dated, statements; and to the consistency of the testimony: consistent, as compared with inconsistent, statements. Another possible hypothesis is that external tests of testimony might be specific to consistency and inconsistency of the testimony rather than to consistency, recency, and proximity as just discussed.

Evaluation of arguments developed through reasoning might be structured in one of two ways—according to argument component or according to type of warrant. The hypothesis that reasoning ability may be structured according to argument component leads to four hypothesized factors—warrant, reservation, reservation answer, and claim. The hypothesis that reasoning ability may be structured according to the type of warrant leads to seven hypothesized factors: sign, causal, class, comparative, parallel case, alternative, and supportive.

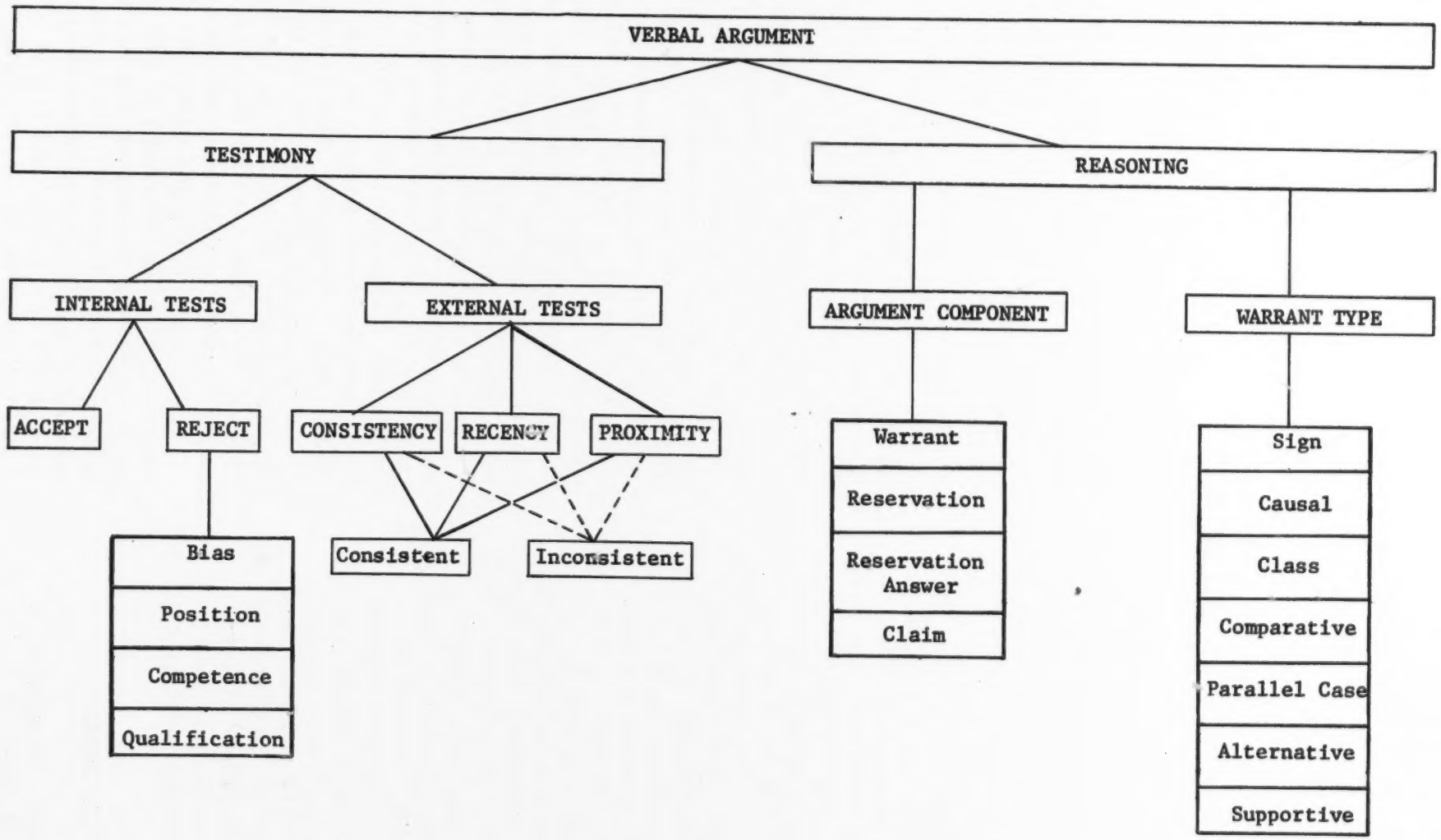

Figure 1. Hypothesized Factor Structures

These analyses suggested 39 subtests to be included in the WISTTRA battery. These 39 subtests were organized into three testimony tests and four reasoning tests for purposes of administration. Testimony I was designed to measure a student's ability to use the internal tests of testimony; Testimony II measures a student's ability to recognize inconsistency between two instances of testimony; and Testimony III measures the use of the external tests of proximity and recency to evaluate testimony. Reasoning I was designed to measure the ability to recognize and select warrants; Reasoning III, the ability to select reservations to an argument; Reasoning II, the ability to recognize statements which answer reservations; and Reasoning IV, the ability to select proper claims. Each of these four reasoning tests includes four items for each of the seven types of warrants. This crossing of the four argument components with the seven warrant types resulted in 28 subtests.

In so far as was possible at least two subtests were constructed to measure each hypothesized factor. It was possible to do this with one exception; there is only one subtest to measure the accept factor for internal tests of testimony.

These alternative sets of factors represent an a priori mode of analysis of the concepts and abilities related to evaluating verbal argument used in ordinary discourse. A major question to be answered in this study is the extent to which the obtained factors parallel these hypothesized analyses. Note that, as illustrated in Figure 1 and as discussed, several levels of specificity are postulated.

Table 1 contains the a priori categorization of each of the subtests for the various hypothesized factors.

TABLE 1

Categorization of WISTTRA Subtests According to the Hypothesized Factor Structures

		TESTIMONY										REASONING										
			INTERNAL			EXTERNAL						ARGUMENT COMPONENT				WARRANT TYPE						
				A	R		C	R	P	C	I		W	R	RA	C	S	Cse	Cl	Co	PC	A	Su
1	Testimony I - Accept	x	x	x																		
2	Testimony I - Bias	x	x		x																	
3	Testimony I - Position	x	x		x																	
4	Testimony I - Competence	x	x		x																	
5	Testimony I - Qualification	x	x		x																	
6	Testimony II - Consistent	x				x	x			x												
7	Testimony II - Inconsistent	x				x	x				x											
8	Testimony III - Recency Consistent	x				x		x		x												
9	Testimony III - Recency Inconsistent	x				x		x			x											
10	Testimony III - Proximity Consistent	x				x			x	x												
11	Testimony III - Proximity Inconsistent	x				x			x		x											
12	Reasoning I - Sign											x	x				x					
13	Reasoning I - Cause											x	x					x				
14	Reasoning I - Class											x	x						x			
15	Reasoning I - Comparative											x	x							x		
16	Reasoning I - Parallel Case											x	x								x	
17	Reasoning I - Alternative											x	x									x
18	Reasoning I - Supportive											x	x									
19	Reasoning II - Sign											x			x		x					
20	Reasoning II - Cause											x			x			x				
21	Reasoning II - Class											x			x				x			
22	Reasoning II - Comparative											x			x					x		
23	Reasoning II - Parallel Case											x			x						x	
24	Reasoning II - Alternative											x			x							x
25	Reasoning II - Supportive											x			x							
26	Reasoning III - Sign											x		x			x					
27	Reasoning III - Cause											x		x				x				
28	Reasoning III - Class											x		x					x			
29	Reasoning III - Comparative											x		x						x		
30	Reasoning III - Parallel Case											x		x							x	
31	Reasoning III - Alternative											x		x								x
32	Reasoning III - Supportive											x		x								
33	Reasoning IV - Sign											x			x		x					
34	Reasoning IV - Cause											x			x			x				
35	Reasoning IV - Class											x			x				x			
36	Reasoning IV - Comparative											x			x					x		
37	Reasoning IV - Parallel Case											x			x						x	
38	Reasoning IV - Alternative											x			x							x
39	Reasoning IV - Supportive											x			x							

II
PROCEDURES

SUBJECTS

The WISTTRA battery was administered to approximately 3000 students in Grades 7 through 12 in four Wisconsin school districts for the purpose of obtaining norms for the tests. These subjects were obtained by randomly sampling schools from a single stratification of the population of Wisconsin school districts based on the results of a study by Miller, et al. (1967). For further details on the population and sampling procedures used refer to Student Abilities in the Evaluation of Verbal Argument (Rott, Feezel, Allen, & Harris, 1969).

The subjects for this study consisted of six of the twelve groups from the normative study —boys and girls for Grades 8, 10, and 12. The complete set of eigenvalues for each of the 12 groups, boys and girls in Grades 7 through 12, was obtained by doing a complete principal components analysis of each variance-covariance matrix. Though the eigenvalues looked quite similar it was decided to factor separately the data for both males and females in Grade 10 since it was concluded by Rott, Feezel, Allen, and Harris (1969) that it seemed that Grade 10 would be a good time to teach the concepts and abilities related to verbal argument. The obtained factor structures for the two groups were quite similar though the two major differences that did appear prompted analyses of both males and females for both Grades 8 and 12. These differences can be seen readily in Table 16 which includes a summary of the comparable common factors obtained for each of the six groups studied.

The total number of subjects within a single age and sex group studied ranged from 179 to 258. The number of subjects, by group, was: Grade 8 males, 200; Grade 8 females, 187; Grade 10 males, 223; Grade 10 females, 258; Grade 12 males, 179; and Grade 12 females, 240.

DATA COLLECTION

The data were collected during successive weeks in April 1968 in Grades 8, 10, and 12 in the following Wisconsin junior and senior high schools: Cedarburg, Clinton, Owen-Withee, and Reedsburg. Testing was conducted in each school in two separate sessions on successive days, afternoon session followed by morning session.

The order of test taking was randomized, within certain tests allocated for a single session, across the four schools to cancel possible learning effects due to tests taken in their logical order. The tests included for the one testing session were Testimony I, Testimony II, Testimony III, and Reasoning II. The other testing session consisted of Reasoning I, Reasoning III, and Reasoning IV. The first group of tests was administered in two of the schools during the first testing session and during the second testing session in the other two schools. This was also the case for the second group of tests.

The students responded to the items of the tests by marking their chosen response directly on an answer sheet. For each testing session, each student was given an envelope containing the printed test booklets and answer sheets. The prescribed order in which the tests were to be taken was marked on the envelope. The test booklets were arranged in this order also.

TREATMENT OF THE DATA

The treatment of the data consisted of two main procedures: reliability estimation and factor analysis. The data were analyzed separately for each grade and sex group.

Hoyt analysis of variance reliability estimates were obtained for each of the subtests for each sex and grade group studied. Means,

standard deviations, and the intercorrelations of the 39 subtests were computed.

Three initial factor solutions were obtained: Alpha (Kaiser & Caffrey, 1965), Harris R-S^2 (Harris, 1962), and Unrestricted Maximum Likli-hood Factor Analysis (UMLFA) (Jöreskog, 1967). A critical value of .05 was used to determine the number of factors for the UMLFA method. Each of these initial solutions was transformed by the normal varimax criterion (Kaiser, 1958) to give a derived orthogonal solution and by the Harris-Kaiser (1964) independent cluster method to give a derived oblique solution.

The common factors from each of the six derived solutions were compared and the comparable common factors, those that are robust across solutions, were determined according to an interpretation strategy suggested by C. Harris (1967) and developed by M. Harris and C. Harris (1969).

The next section will include the results obtained and a discussion of these results.

III
RESULTS AND DISCUSSION

In this section information will be presented regarding the reliability estimates and the obtained factor structures for each of the six groups studied.

RELIABILITY ESTIMATES

The mean, standard deviation, and reliability estimate for each of the subtests for each of the six groups are given in Table 2.

The reliability estimates, in general, tend to be slightly higher for males than for females of the same grade. They are quite similar for 10th and 12th Grade students. The reliability estimates tend to be higher for Grades 10 and 12 than they are for Grade 8.

The subtests of the testimony tests all have reliability estimates of a sufficient magnitude for research purposes. For 8th Grade subjects the spread of these estimates is from .40 to .74, the spread for 10th Grade subjects is from .50 to .81, and for 12th Grade subjects it is from .47 to .84.

As a group the reliability estimates for the reasoning subtests are lower than they are for the testimony subtests. This is expected due to the very small number of items (4) in each subtest. The tests were constructed this way to keep the total testing time required to a minimum since previous information indicated that these subtests were not measuring separate abilities. It was hoped that with four items it would be possible to get reliability estimates sufficiently high for research purposes. This was accomplished in most cases.

For the 8th Grade subjects the spread of the reliability estimates for the reasoning subtests is from -.09 to .62. Of the 28 subtests, seven of them have a reliability estimate below .20 (two subtests for males and five for females) and 18 were below .30 (eleven for males and seven for females). The spread of reliability estimates for the 10th Grade subjects is from .05 to .66. The estimates for Grade 10 males are all .20 or greater with five being less than .30; for Grade 10 females five are less than .30 and two of these are less than .20. These are .09 for R-IV PC and .05 for R-IV Su. The spread for 12th Grade subjects is from -.06 to .69. The estimates for Grade 12 males are all .20 or greater with two being less than .30; for Grade 12 females seven are less than .30 with four of these being less than .20. These are .19 for R-III Cse, .18 for R-IV Cl, -.06 for R-IV PC, and .14 for R-IV Su.

These internal consistency reliability estimates may be misleadingly low since they are based upon only four items. The value of θ, which is an index of discrimination, for each of the items in these subtests with low reliabilities is of a desirable magnitude. Thus, each item is discriminating properly. The problem seems to be one of not having enough subtest variance with four items when the difficulty level of the items is much different from .50. Indications that this is the case are evident in the factor coefficients. Some subtests with low reliability estimates do appear on the factors with coefficients greater than .30. For example, RII-Cse which has a reliability estimate of -.06 for Grade 8 females, does appear on Comparable Common Factor 6.

FACTOR ANALYSES

The intercorrelation matrices for the 39 subtests upon which the factor analyses were based, can be found in Tables 3 through 8.

The numbers of factors obtained for the initial solutions and for the derived solutions, orthogonal and oblique, according to the numbers of common, specific, and null factors, are given in Table 9. A common factor is defined as one having at least two variables with coefficients greater than .30 (absolute). A specific factor has only one coefficient greater than .30

TABLE 2

Means, Standard Deviations, and Reliability Estimates for Males and Females in Grades 8, 10, and 12

Subtest	Number of Items for All Grades (Male & Female)	Mean						Standard Deviation						Hoyt Reliability					
		8		10		12		8		10		12		8		10		12	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1 TI-A	20	14.99	15.65	16.44	17.14	17.14	17.68	3.49	3.16	3.46	2.48	3.21	2.41	.74	.72	.81	.68	.81	.72
2 TI-B	10	5.48	5.38	5.86	5.57	5.91	5.74	2.05	2.28	2.13	2.20	2.15	2.31	.53	.66	.61	.66	.61	.70
3 TI-P	10	5.91	5.91	6.50	6.66	6.54	6.67	1.92	1.90	1.96	1.90	2.08	2.03	.41	.43	.51	.50	.59	.60
4 TI-C	10	6.75	6.88	7.45	7.30	7.55	7.32	2.01	2.07	2.01	2.13	1.96	1.97	.52	.57	.60	.65	.60	.58
5 TI-Q	10	6.65	7.05	7.45	7.88	7.85	7.88	2.02	1.97	1.92	1.73	1.91	1.72	.52	.53	.56	.53	.61	.53
6 TII-C	10	6.27	6.59	6.61	7.54	7.21	7.41	2.40	2.45	2.68	2.48	2.54	2.81	.66	.70	.76	.78	.76	.84
7 TII-I	10	6.40	6.57	6.72	7.60	7.32	7.57	2.29	2.18	2.55	2.15	2.48	2.26	.63	.59	.73	.68	.76	.72
8 TIII-RC	10	6.10	6.45	6.83	6.94	6.82	7.20	2.24	2.18	2.21	2.26	2.30	2.12	.59	.59	.63	.67	.67	.66
9 TIII-RI	10	6.63	7.27	7.33	7.75	7.48	7.77	2.00	1.86	1.91	1.73	1.94	1.64	.51	.53	.53	.52	.58	.47
10 TIII-PC	10	6.06	6.29	6.52	6.66	6.56	6.92	2.06	1.86	2.25	2.13	2.14	2.23	.50	.40	.62	.60	.58	.66
11 TIII-PI	10	5.25	5.23	5.61	5.70	5.95	5.79	2.03	1.91	2.10	2.10	1.99	2.18	.47	.41	.54	.56	.48	.61
12 RI-S	4	1.51	1.78	2.08	2.27	2.09	2.48	1.16	1.34	1.33	1.37	1.44	1.23	.40	.60	.59	.64	.69	.50
13 RI-Cse	4	1.42	1.61	1.90	2.01	2.01	2.30	1.04	1.11	1.23	1.25	1.24	1.26	.26	.38	.50	.54	.49	.57
14 RI-Cl	4	1.27	1.37	1.84	2.11	1.99	2.12	1.13	1.11	1.21	1.29	1.39	1.31	.43	.36	.43	.54	.64	.56
15 RI-Co	4	1.49	1.74	1.93	2.30	2.11	2.36	1.30	1.28	1.37	1.33	1.37	1.34	.61	.57	.63	.62	.64	.65
16 RI-PC	4	1.30	1.39	1.75	1.93	1.99	2.21	1.18	1.15	1.35	1.38	1.40	1.33	.51	.46	.63	.66	.66	.62
17 RI-A	4	1.29	1.55	1.85	2.13	1.99	2.42	1.08	1.21	1.33	1.32	1.42	1.26	.36	.50	.60	.60	.68	.57
18 RI-Su	4	1.15	1.35	1.52	1.72	1.66	1.82	1.03	1.02	1.21	1.23	1.34	1.22	.36	.29	.50	.51	.64	.48
19 RII-S	4	2.64	2.80	2.98	3.09	3.09	3.11	1.02	.91	.90	.82	.89	.76	.25	.18	.20	.28	.23	.21
20 RII-Cse	4	2.27	2.15	2.45	2.40	2.68	2.51	.94	.95	1.09	1.03	1.15	1.11	-.09	-.06	.33	.21	.49	.47
21 RII-Cl	4	2.50	2.50	2.82	2.95	2.96	3.05	1.07	1.13	1.02	1.09	1.06	1.00	.24	.36	.28	.48	.42	.39
22 RII-Co	4	2.62	2.66	3.01	3.15	3.02	3.33	1.10	1.13	.97	1.01	1.11	.86	.35	.42	.29	.47	.53	.34
23 RII-PC	4	2.55	2.60	2.86	3.01	3.17	3.27	1.03	1.06	1.09	1.02	.98	.95	.20	.27	.44	.39	.42	.45
24 RII-A	4	2.58	2.76	2.83	3.17	2.97	3.31	1.08	1.13	1.09	1.06	1.13	.95	.28	.44	.41	.56	.54	.49
25 RII-Su	4	2.59	2.78	2.78	3.22	3.13	3.32	1.07	.94	1.08	.89	.94	.93	.31	.13	.41	.34	.34	.51
26 RIII-S	4	2.27	2.68	2.67	3.01	2.74	3.26	1.19	1.14	1.18	1.09	1.21	.97	.44	.47	.52	.52	.55	.49
27 RIII-Cse	4	1.78	2.10	2.36	2.57	2.39	2.66	1.14	1.15	1.19	1.07	1.19	1.00	.34	.33	.44	.30	.44	.19
28 RIII-Cl	4	2.40	2.69	2.94	3.16	3.04	3.29	1.26	1.18	1.13	.96	1.15	.90	.54	.49	.54	.41	.62	.41
29 RIII-Co	4	2.16	2.71	2.82	3.15	2.86	3.46	1.36	1.23	1.27	1.03	1.28	.83	.62	.58	.66	.51	.68	.46
30 RIII-PC	4	1.97	1.90	2.45	2.49	2.52	2.77	1.29	1.17	1.17	1.19	1.31	1.12	.56	.39	.46	.53	.62	.50
31 RIII-A	4	1.76	1.96	2.30	2.60	2.28	2.65	1.11	1.24	1.17	1.08	1.18	1.14	.30	.51	.42	.36	.40	.43
32 RIII-Su	4	1.54	1.68	1.97	2.17	2.19	2.50	1.05	1.12	1.13	1.05	1.20	1.02	.27	.38	.39	.33	.49	.37
33 RIV-S	4	2.16	2.42	2.68	2.85	2.71	3.02	1.10	1.17	1.11	1.01	1.20	.98	.25	.41	.40	.32	.55	.34
34 RIV-Cse	4	2.57	2.49	2.81	2.96	2.86	3.25	1.00	1.13	1.09	1.00	1.13	.85	.22	.43	.44	.35	.52	.29
35 RIV-Cl	4	2.33	2.61	2.75	2.98	2.73	3.11	1.08	1.09	1.13	.97	1.10	.87	.27	.31	.45	.29	.41	.18
36 RIV-Co	4	2.33	2.39	2.79	2.76	2.80	2.98	1.11	1.13	1.05	1.03	1.12	.93	.37	.49	.44	.45	.52	.40
37 RIV-PC	4	1.92	2.10	2.23	2.34	2.34	2.55	1.01	.98	1.02	.96	1.00	.86	.16	.07	.23	.09	.20	-.06
38 RIV-A	4	2.43	2.66	2.77	3.09	2.79	3.11	1.11	1.09	1.11	.95	1.06	.91	.32	.38	.44	.34	.37	.26
39 RIV-Su	4	2.32	2.28	2.66	2.75	2.80	3.14	1.08	1.04	1.04	.94	1.10	.86	.22	.13	.24	.05	.42	.14

TABLE 3

Intercorrelations of WISTTRA
Subtests for Grade 8 Males *

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S
TI-B	21											
TI-P	30	20										
TI-C	31	39	37									
TI-Q	51	20	44	36								
TII-C	49	10	26	35	32							
TII-I	46	17	27	33	42	65						
TIII-RC	38	19	26	30	39	40	42					
TIII-RI	48	29	31	34	38	29	34	42				
TIII-PC	39	07	23	19	33	29	32	34	23			
TIII-PI	42	12	26	16	37	32	30	32	25	47		
RI-S	26	15	20	24	27	32	33	23	31	21	29	
RI-Cse	20	06	14	19	20	19	28	22	16	04	22	12
RI-C1	26	12	13	17	31	19	24	27	26	14	15	26
RI-Co	47	12	23	19	29	43	30	26	26	19	28	26
RI-PC	25	02	23	09	37	35	37	28	33	16	23	32
RI-A	37	22	19	23	31	40	40	31	31	22	30	26
RI-Su	30	18	20	11	25	29	24	29	27	19	24	26
RII-S	34	20	41	23	48	37	42	29	25	19	26	25
RII-Cse	30	23	27	22	28	33	33	21	27	15	23	27
RII-C1	38	18	22	25	34	43	30	27	27	17	32	26
RII-Co	37	21	38	21	42	38	42	32	31	25	33	29
RII-PC	33	14	29	24	31	44	32	33	33	21	27	25
RII-A	42	13	30	17	34	35	32	23	36	25	26	25
RII-Su	35	09	16	22	32	33	33	22	25	05	28	28
RIII-S	54	20	32	33	43	46	42	37	38	26	25	29
RIII-Cse	43	22	24	26	27	27	20	32	40	25	27	27
RIII-C1	51	12	27	31	34	44	36	35	41	29	33	34
RIII-Co	52	19	31	29	40	42	42	31	42	28	36	32
RIII-PC	47	32	32	30	52	28	31	42	43	24	38	28
RIII-A	43	19	32	26	38	33	30	33	35	32	29	25
RIII-Su	41	19	20	10	35	29	27	30	39	17	22	18
RIV-S	43	12	16	30	30	38	40	25	40	16	20	23
RIV-Cse	37	09	20	31	33	36	33	32	24	20	19	24
RIV-C1	39	19	25	22	35	37	30	29	34	16	30	26
RIV-Co	39	12	23	21	30	29	22	18	22	21	23	21
RIV-PC	40	20	16	24	28	27	30	32	29	12	15	14
RIV-A	45	21	27	31	35	33	26	30	40	23	27	33
RIV-Su	34	13	12	15	23	23	23	26	37	15	18	26

* Decimals have been omitted.

TABLE 3

Intercorrelations of WISTTRA Subtests for Grade 8 Males*

	RI Cse	RI C1	RI Co	RI PC	RI A	RI Su	RII S	RII Cse	RII C1	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse
TI-B															
TI-P															
TI-C															
TI-Q															
TII-C															
TII-I															
TIII-RC															
TIII-RI															
TIII-PC															
TIII-PI															
RI-S															
RI-Cse															
RI-C1	05														
RI-Co	23	21													
RI-PC	11	20	22												
RI-A	26	24	29	27											
RI-Su	08	22	21	40	26										
RII-S	10	20	25	24	32	31									
RII-Cse	12	17	23	30	21	31	37								
RII-C1	15	24	31	36	33	24	38	40							
RII-Co	13	33	30	33	35	32	44	41	41						
RII-PC	10	28	40	34	37	38	40	31	35	49					
RII-A	10	18	32	32	31	28	39	39	38	50	46				
RII-Su	27	04	28	29	21	23	47	29	40	31	37	29			
RIII-S	23	26	45	30	32	25	36	27	35	43	42	44	27		
RIII-Cse	11	32	37	17	31	18	24	29	27	35	37	33	21	45	
RIII-C1	15	34	41	31	31	32	36	30	32	34	37	31	18	54	47
RIII-Co	19	36	45	30	39	31	43	42	28	47	44	43	34	56	45
RIII-PC	15	27	28	34	25	35	37	35	37	46	35	38	34	45	38
RIII-A	15	33	33	31	25	26	35	29	33	44	38	34	15	45	42
RIII-Su	16	23	34	29	28	31	30	26	25	31	30	29	20	38	32
RIV-S	20	19	28	18	22	15	24	13	20	27	25	27	26	26	19
RIV-Cse	22	13	23	20	24	21	33	16	28	27	34	33	27	37	25
RIV-C1	17	29	38	25	28	20	33	34	30	32	29	31	30	42	33
RIV-Co	05	24	32	17	12	31	26	22	29	39	26	25	27	39	28
RIV-PC	18	21	20	19	19	21	21	10	17	20	23	24	17	35	08
RIV-A	18	25	38	22	27	21	33	21	26	25	33	31	20	44	40
RIV-Su	19	17	39	13	27	10	23	24	21	15	25	24	26	41	31

TABLE 3

Intercorrelations of WISTTRA Subtests for Grade 8 Males*

	RIII Cl	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV Cl	RIV Co	RIV PC	RIV A
TI-B											
TI-P											
TI-C											
TI-Q											
TII-C											
TII-I											
TIII-RC											
TIII-RI											
TIII-PC											
TIII-PI											
RI-S											
RI-Cse											
RI-Cl											
RI-Co											
RI-PC											
RI-A											
RI-Su											
RII-S											
RII-Cse											
RII-Cl											
RII-Co											
RII-PC											
RII-A											
RII-Su											
RIII-S											
RIII-Cse											
RIII-Cl											
RIII-Co	58										
RIII-PC	40	50									
RIII-A	46	45	38								
RIII-Su	36	42	26	39							
RIV-S	25	38	31	30	24						
RIV-Cse	32	28	28	30	21	40					
RIV-Cl	41	47	30	39	24	28	28				
RIV-Co	40	35	40	36	14	32	27	37			
RIV-PC	30	23	26	21	32	37	25	25	18		
RIV-A	49	49	29	46	26	38	36	44	46	25	
RIV-Su	30	32	25	26	23	22	18	38	23	28	32

TABLE 4

Intercorrelations of WISTTRA Subtests for Grade 8 Females*

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S	RI Cse	RI Cl	RI Co	RI PC	RI A	RI Su
TI-B	01																	
TI-P	31	13																
TI-C	14	32	33															
TI-Q	39	10	36	28														
TII-C	39	13	12	11	30													
TII-I	31	11	24	11	32	69												
TIII-RC	33	08	22	21	33	30	30											
TIII-RI	42	16	15	20	26	19	23	42										
TIII-PC	30	08	27	18	27	14	24	32	24									
TIII-PI	14	-01	03	12	18	04	10	19	-07	31								
RI-S	30	-02	12	13	26	31	25	20	21	02	-02							
RI-Cse	13	13	02	19	08	22	10	20	14	07	-02	09						
RI-Cl	39	02	10	14	22	20	25	21	28	14	14	32	19					
RI-Co	41	-02	11	24	24	33	32	37	25	15	20	29	17	27				
RI-PC	28	05	24	22	24	20	34	34	29	22	08	26	18	26	19			
RI-A	37	17	12	25	27	37	33	27	35	24	12	30	30	32	40	33		
RI-Su	30	12	07	06	17	29	31	28	30	11	03	14	16	30	34	22	37	
RII-S	42	14	15	17	34	36	36	26	32	18	03	27	22	31	40	38	36	35
RII-Cse	30	03	18	20	25	26	31	33	33	19	-01	23	13	17	24	43	24	26
RII-Cl	30	05	16	08	26	23	27	26	24	24	04	24	15	23	26	28	28	22
RII-Co	47	-04	17	14	31	32	28	34	37	27	08	20	18	23	28	25	32	23
RII-PC	35	06	17	16	35	38	35	28	23	26	12	17	16	20	31	17	30	29
RII-A	36	04	00	17	28	35	41	30	25	24	12	21	18	20	29	37	27	32
RII-Su	39	03	15	22	22	25	26	35	24	20	14	32	13	24	33	28	30	32
RIII-S	48	06	28	25	24	38	38	27	38	23	10	27	15	28	36	29	33	32
RIII-Cse	39	15	17	20	21	41	25	23	38	08	08	24	14	26	25	29	30	25
RIII-Cl	52	12	23	20	41	32	36	39	45	28	13	30	16	22	33	31	33	24
RIII-Co	47	11	33	26	39	46	40	37	43	29	14	37	10	28	38	36	33	23
RIII-PC	29	04	08	14	17	31	32	27	24	16	07	18	02	27	34	17	25	31
RIII-A	50	09	19	16	23	32	29	31	41	18	05	26	12	37	35	34	41	31
RIII-Su	42	10	21	07	24	28	26	26	28	26	25	15	16	30	22	38	30	22
RIV-S	46	11	21	19	27	31	27	24	26	17	02	21	03	30	34	20	33	30
RIV-Cse	39	03	15	15	29	29	24	28	27	22	04	28	08	30	33	26	30	28
RIV-Cl	45	11	24	22	26	31	28	31	28	24	15	21	07	34	38	31	27	29
RIV-Co	54	10	11	18	29	37	35	31	40	31	14	27	21	35	29	31	36	28
RIV-PC	14	-05	14	04	21	17	21	20	18	12	09	05	15	24	12	03	12	10
RIV-A	30	13	14	16	18	29	18	18	21	16	03	26	02	19	23	20	27	22
RIV-Su	29	06	19	08	22	23	20	15	29	17	05	18	05	21	18	21	23	12

* Decimals have been omitted.

TABLE 4

Intercorrelations of WISTTRA Subtests for Grade 8 Females*

	RII S	RII Cse	RII C1	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse	RIII C1	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV C1	RIV Co	RIV PC	RIV A
TI-B																				
TI-P																				
TI-C																				
TI-Q																				
TII-C																				
TII-I																				
TIII-RC																				
TIII-RI																				
TIII-PC																				
TIII-PI																				
RI-S																				
RI-Cse																				
RI-C1																				
RI-Co																				
RI-PC																				
RI-A																				
RI-Su																				
RII-S																				
RII-Cse	44																			
RII-C1	42	35																		
RII-Co	46	50	47																	
RII-PC	45	32	30	55																
RII-A	46	37	38	51	55															
RII-Su	38	34	41	37	37	37														
RIII-S	47	35	31	35	44	37	35													
RIII-Cse	45	26	20	29	36	30	31	46												
RIII-C1	38	34	29	40	34	28	36	48	38											
RIII-Co	44	37	33	40	32	35	36	57	45	55										
RIII-PC	31	17	23	24	31	30	32	31	29	27	44									
RIII-A	47	40	36	45	48	37	33	53	38	50	50	39								
RIII-Su	35	31	29	33	39	29	31	40	46	49	42	30	43							
RIV-S	45	29	33	38	49	36	37	49	32	44	39	32	52	45						
RIV-Cse	46	29	35	37	39	33	31	51	29	33	41	38	48	32	54					
RIV-C1	42	38	36	34	29	31	38	48	33	43	44	26	53	34	44	31				
RIV-Co	51	39	38	45	30	39	39	41	35	43	52	28	47	36	37	45	34			
RIV-PC	24	15	06	20	25	22	20	17	16	15	12	19	14	15	16	21	15	04		
RIV-A	30	28	31	31	20	14	28	30	33	42	39	24	31	36	33	25	33	32	10	
RIV-Su	30	32	24	25	24	22	21	29	30	30	24	18	37	27	35	34	30	30	17	1

TABLE 5

Intercorrelations of WISTTRA Subtests for Grade 10 Males*

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S	RI Cse	RI Cl	RI Co	RI PC	RI A	RI Su
TI-B	18																	
TI-P	25	33																
TI-C	30	34	34															
TI-Q	54	37	53	42														
TII-C	53	23	24	22	35													
TII-I	43	23	33	26	44	75												
TIII-RC	49	24	21	33	41	38	43											
TIII-RI	43	25	37	26	43	34	37	59										
TIII-PC	44	17	19	19	38	46	37	45	34									
TIII-PI	42	19	10	11	27	45	40	48	28	56								
RI-S	39	26	25	19	34	35	33	40	37	33	40							
RI-Cse	26	26	14	07	20	31	31	44	48	30	32	37						
RI-Cl	26	25	10	19	26	27	26	44	38	26	30	34	41					
RI-Co	38	23	25	22	33	35	35	37	41	26	28	41	39	34				
RI-PC	45	30	30	25	52	35	41	45	45	36	37	45	33	37	43			
RI-A	43	20	22	20	42	38	33	46	40	29	32	44	41	37	45	40		
RI-Su	37	28	24	29	37	36	32	40	37	35	35	48	38	41	38	46	49	
RII-S	43	27	25	08	37	35	39	32	30	26	32	28	29	21	39	37	36	33
RII-Cse	39	20	25	20	36	45	38	38	32	29	30	26	29	19	30	30	29	41
RII-Cl	23	15	20	11	26	28	31	33	42	22	30	25	33	25	27	32	34	29
Rii-Co	34	21	19	17	30	43	45	47	33	30	44	31	37	28	43	41	41	47
RII-PC	42	18	24	16	33	46	48	42	33	31	41	32	37	31	45	38	45	39
RII-A	36	23	27	18	39	38	44	39	36	34	34	34	37	33	36	49	41	40
RII-Su	34	21	29	08	28	35	38	35	36	31	36	24	31	23	33	29	29	33
RIII-S	37	20	25	12	32	28	35	35	25	19	22	36	21	20	34	38	39	32
RIII-Cse	37	26	25	14	39	33	34	40	39	32	21	27	34	27	26	39	34	42
RIII-Cl	48	25	25	18	36	33	31	37	36	21	27	34	25	16	34	44	32	30
RIII-Co	45	21	32	19	43	40	45	39	32	28	24	37	20	29	34	36	38	32
RIII-PC	38	22	33	12	42	35	32	38	39	30	30	30	32	24	38	42	38	35
RIII-A	32	26	27	16	37	38	37	32	34	32	31	25	25	32	34	39	30	32
RIII-Su	48	21	17	10	35	32	28	32	25	27	26	21	26	22	26	32	26	34
RIV-S	26	21	13	08	26	23	17	30	21	22	19	33	23	20	32	33	30	26
RIV-Cse	33	27	22	08	34	26	32	33	33	21	23	38	35	20	39	30	41	36
RIV-Cl	30	27	27	17	34	27	28	33	31	18	23	26	22	20	30	32	38	30
RIV-Co	35	25	25	11	33	37	34	39	37	21	34	38	30	33	40	38	45	41
RIV-PC	38	25	24	16	35	34	33	24	26	28	32	30	27	15	32	36	31	30
RIV-A	23	30	27	11	28	27	27	29	27	16	21	30	27	21	35	37	30	34
RIV-Su	25	21	21	15	23	19	18	28	26	17	09	27	21	12	26	30	34	31

*Decimals have been omitted.

TABLE 5

Intercorrelations of WISTTRA
Subtests for Grade 10 Males *

	RII S	RII Cse	RII C1	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse	RIII C1	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV C1	RIV Co	RIV PC	RIV A
TI-B																				
TI-P																				
TI-C																				
TI-Q																				
TII-C																				
TII-I																				
TIII-RC																				
TIII-RI																				
TIII-PC																				
TIII-PI																				
RI-S																				
RI-Cse																				
RI-C1																				
RI-Co																				
RI-PC																				
RI-A																				
RI-Su																				
RII-S																				
RII-Cse	47																			
RII-C1	43	44																		
Rii-Co	54	51	49																	
RII-PC	61	49	54	66																
RII-A	51	48	48	56	58															
RII-Su	52	42	41	52	57	43														
RIII-S	47	29	29	45	43	42	43													
RIII-Cse	41	40	35	43	49	41	32	48												
RIII-C1	46	37	29	38	41	40	38	51	43											
RIII-Co	44	41	35	50	48	41	44	63	54	59										
RIII-PC	44	46	39	43	44	41	44	49	48	58	62									
RIII-A	47	38	34	44	49	49	41	46	46	54	58	54								
RIII-Su	47	40	31	39	45	43	33	39	45	43	49	48	38							
RIV-S	36	17	22	30	32	25	27	34	27	45	30	33	33	18						
RIV-Cse	39	28	29	38	42	35	39	41	35	50	42	44	36	26	46					
RIV-C1	34	33	38	42	44	43	33	37	35	38	42	37	29	31	24	36				
RIV-Co	43	39	37	47	45	36	30	44	44	44	49	50	45	37	34	41	41			
RIV-PC	38	37	34	39	45	36	34	34	37	40	36	36	38	27	34	34	24	31		
RIV-A	34	28	25	37	39	34	28	43	31	40	37	39	43	18	40	49	35	42	30	
RIV-Su	29	19	28	27	33	29	21	33	28	47	42	39	39	22	33	40	36	29	33	35

TABLE 6

Intercorrelations of WISTTRA Subtests for Grade 10 Females*

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S	RI Cse	RI Cl	RI Co	RI PC	RI A	RI Su
TI-B	03																	
TI-P	10	17																
TI-C	17	34	33															
TI-Q	40	29	46	43														
TII-C	40	16	23	15	36													
TII-I	42	19	26	18	37	74												
TIII-RC	29	12	17	13	28	30	35											
TIII-RI	24	15	23	23	31	32	34	36										
TIII-PC	25	10	22	13	25	25	29	36	16									
TIII-PI	17	07	13	07	10	25	22	35	09	53								
RI-S	25	25	17	16	18	41	39	24	31	14	15							
RI-Cse	26	17	20	08	21	36	41	28	23	17	14	35						
RI-Cl	35	23	26	17	26	51	55	36	26	28	16	45	39					
RI-Co	41	17	30	25	35	46	53	24	32	33	17	36	32	48				
RI-PC	32	20	17	11	26	39	38	20	20	20	14	41	29	41	41			
RI-A	42	19	30	20	35	41	52	27	26	23	16	38	28	44	45	44		
RI-Su	39	17	31	22	33	46	50	31	28	28	14	43	36	47	47	40	47	
RII-S	39	20	14	16	23	46	49	34	36	15	08	36	44	43	39	42	37	40
RII-Cse	35	23	26	18	27	43	54	34	28	21	16	25	36	44	41	42	34	46
RII-Cl	39	13	27	17	32	51	57	32	29	23	21	38	38	47	46	39	39	50
RII-Co	31	29	19	21	31	48	54	29	36	17	20	31	41	39	40	40	35	44
RII-PC	33	24	21	19	33	42	45	30	29	26	18	37	41	38	42	46	37	46
RII-A	38	18	27	19	34	54	58	34	31	24	16	38	44	44	55	48	44	46
RII-Su	38	22	20	16	29	50	46	29	28	19	20	31	41	40	39	41	30	43
RIII-S	51	17	25	24	37	52	53	34	35	21	21	42	38	45	38	42	39	46
RIII-Cse	34	19	20	21	31	36	39	25	26	09	11	30	30	32	36	29	31	33
RIII-Cl	44	20	25	28	39	41	44	38	34	26	15	27	28	40	44	36	38	42
RIII-Co	49	24	25	27	41	47	49	32	30	18	11	33	32	51	48	37	41	44
RIII-PC	44	27	29	25	37	46	49	27	32	26	16	37	32	41	48	40	42	45
RIII-A	33	31	16	18	29	44	42	31	26	19	14	34	33	38	31	29	34	45
RIII-Su	32	18	21	15	24	44	42	28	24	22	21	28	38	38	33	36	29	35
RIV-S	34	12	18	09	27	36	43	24	18	23	16	30	22	34	36	35	36	33
RIV-Cse	44	27	21	17	36	33	36	29	25	17	08	28	28	37	40	35	39	38
RIV-Cl	33	28	24	16	28	41	40	27	28	29	20	36	29	43	45	30	38	42
RIV-Co	35	29	25	24	35	45	53	31	38	18	11	39	38	46	47	36	48	49
RIV-PC	25	17	09	06	14	26	29	19	10	16	16	23	32	24	19	15	20	28
RIV-A	38	16	25	23	30	35	44	32	30	25	11	29	19	39	44	36	40	36
RIV-Su	25	16	11	05	18	27	32	21	21	29	13	27	25	28	32	39	30	28

* Decimals have been omitted.

TABLE 6

Intercorrelations of WISTTRA Subtests for Grade 10 Females*

	RII S	RII Cse	RII Cl	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse	RIII Cl	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV Cl	RIV Co	RIV PC	RIV A
TI-B																				
TI-P																				
TI-C																				
TI-Q																				
TII-C																				
TII-I																				
TIII-RC																				
TIII-RI																				
TIII-PC																				
TIII-PI																				
RI-S																				
RI-Cse																				
RI-Cl																				
RI-Co																				
RI-PC																				
RI-A																				
RI-Su																				
RII-S																				
RII-Cse	58																			
RII-Cl	58	60																		
RII-Co	64	61	63																	
RII-PC	60	60	58	69																
RII-A	66	61	67	67	65															
RII-Su	54	54	51	58	60	56														
RIII-S	46	44	44	48	49	48	40													
RIII-Cse	38	37	33	38	41	40	37	43												
RIII-Cl	41	40	40	44	33	44	42	49	42											
RIII-Co	46	43	44	48	40	49	45	52	44	48										
RIII-PC	47	49	44	53	52	56	47	55	42	49	52									
RIII-A	47	37	42	44	36	37	39	53	34	46	47	48								
RIII-Su	48	50	55	45	46	51	41	42	37	34	48	40	36							
RIV-S	34	34	38	34	43	36	36	40	25	35	40	39	31	34						
RIV-Cse	39	32	35	37	37	38	37	40	28	37	47	39	38	31	36					
RIV-Cl	31	30	33	44	37	39	40	31	23	44	46	45	30	28	36	40				
RIV-Co	46	43	42	44	35	44	37	48	32	48	47	45	40	41	34	46	46			
RIV-PC	30	30	34	35	39	23	37	28	25	28	25	27	31	26	25	24	27	25		
RIV-A	45	34	38	38	32	41	27	44	30	41	43	33	36	32	32	43	33	41	18	
RIV-Su	28	29	33	25	29	35	27	34	14	33	32	33	22	24	32	36	33	33	21	21

TABLE 7

Intercorrelations of WISTTRA Subtests for Grade 12 Males*

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S	RI Cse	RI Cl	RI Co	RI PC	RI A
TI-B	15																
TI-P	34	36															
TI-C	34	48	42														
TI-Q	59	35	48	46													
TII-C	47	21	29	23	36												
TII-I	54	23	29	25	40	79											
TIII-RC	51	09	15	20	34	41	48										
TIII-RI	53	28	31	33	47	47	51	47									
TIII-PC	42	31	34	25	40	34	41	42	42								
TIII-PI	37	12	25	17	31	33	35	41	38	53							
RI-S	37	23	23	21	26	37	42	34	36	37	36						
RI-Cse	40	24	22	23	31	27	42	31	40	38	27	40					
RI-Cl	32	21	27	17	34	35	42	34	35	45	36	42	35				
RI-Co	50	28	37	29	48	42	49	41	49	43	38	45	36	51			
RI-PC	38	28	26	22	37	34	36	38	33	45	33	47	37	47	48		
RI-A	39	17	25	19	34	47	41	36	39	34	26	44	31	39	45	39	
RI-Su	40	33	33	23	41	42	46	36	29	47	34	31	36	43	58	49	32
RII-S	49	27	30	20	42	56	62	41	47	42	33	34	37	42	51	33	42
RII-Cse	49	21	23	18	36	46	50	38	48	42	42	40	41	36	48	39	40
RII-Cl	45	26	35	23	43	47	55	42	45	48	37	44	37	39	49	34	42
RII-Co	45	26	29	19	40	41	46	29	41	46	40	32	32	42	48	39	37
RII-PC	46	30	32	26	41	46	57	38	44	48	39	32	42	38	44	40	40
RII-A	50	33	35	27	51	51	57	40	47	50	35	44	39	33	44	47	41
RII-Su	46	20	20	22	39	52	53	33	45	44	35	41	43	35	39	39	41
RIII-S	54	22	32	31	39	43	54	41	48	49	32	34	46	39	39	38	40
RIII-Cse	47	25	25	16	37	37	44	35	46	41	34	33	37	35	42	41	32
RIII-Cl	59	15	34	29	55	46	54	35	48	40	26	35	41	32	47	37	35
RIII-Co	52	17	44	21	43	50	50	34	42	36	30	34	30	36	52	32	49
RIII-PC	45	15	27	25	47	43	44	34	43	39	27	38	29	32	51	43	40
RIII-A	42	13	24	21	43	43	48	33	38	38	34	32	34	37	41	42	40
RIII-Su	48	20	21	14	35	54	61	41	39	49	36	40	45	47	40	36	42
RIV-S	46	18	35	34	40	33	38	35	38	35	22	32	32	33	37	44	46
RIV-Cse	59	20	28	28	47	44	49	31	48	45	33	39	37	32	43	46	40
RIV-Cl	48	18	25	19	39	44	47	34	41	50	32	33	26	27	41	33	42
RIV-Co	52	16	35	28	40	40	49	28	35	38	34	40	37	34	44	34	30
RIV-PC	32	20	25	12	28	36	42	29	39	31	24	29	40	25	35	37	23
RIV-A	50	14	25	19	43	41	46	32	43	37	32	28	29	34	36	35	33
RIV-Su	42	19	25	17	35	37	36	29	37	31	24	35	28	31	34	27	41

* Decimals have been omitted.

TABLE 7

Intercorrelations of WISTTRA Subtests for Grade 12 Males*

	RI Su	RII S	RII Cse	RII C1	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse	RIII C1	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV C1	RIV Co	RIV PC	RIV A
TI-B																					
TI-P																					
TI-C																					
TI-Q																					
TII-C																					
TII-I																					
TIII-RC																					
TIII-RI																					
TIII-PC																					
TIII-PI																					
RI-S																					
RI-Cse																					
RI-C1																					
RI-Co																					
RI-PC																					
RI-A																					
RI-Su																					
RII-S	54																				
RII-Cse	44	60																			
RII-C1	45	65	47																		
RII-Co	45	64	54	59																	
RII-PC	45	62	57	62	68																
RII-A	47	61	63	66	65	67															
RII-Su	40	62	58	61	57	62	63														
RIII-S	46	48	55	46	47	55	59	51													
RIII-Cse	45	48	50	42	44	48	49	43	52												
RIII-C1	40	50	49	45	45	47	50	48	67	46											
RIII-Co	46	55	48	44	47	44	50	45	58	49	66										
RIII-PC	45	44	49	48	52	48	52	50	55	46	61	58									
RIII-A	38	46	49	47	47	45	52	46	57	50	52	53	56								
RIII-Su	49	53	53	50	45	51	52	50	65	54	56	53	52	48							
RIV-S	37	44	40	43	44	47	50	41	51	42	46	46	49	48	47						
RIV-Cse	46	50	47	47	48	46	53	46	55	51	59	46	58	52	50	54					
RIV-C1	38	52	48	52	50	49	56	50	48	40	40	48	54	49	52	48	48				
RIV-Co	38	47	37	49	43	49	53	44	58	38	56	50	44	44	47	42	50	44			
RIV-PC	32	38	40	41	33	45	48	46	49	45	46	41	43	45	42	34	38	33	36		
RIV-A	42	43	40	41	39	44	44	38	52	43	51	39	46	45	44	48	55	39	55	43	
RIV-Su	34	39	37	40	40	37	43	43	48	39	45	43	45	44	41	50	58	49	36	37	43

TABLE 8

Intercorrelations of WISTTRA Subtests for Grade 12 Females*

	TI A	TI B	TI P	TI C	TI Q	TII C	TII I	TIII RC	TIII RI	TIII PC	TIII PI	RI S	RI Cse	RI Cl	RI Co	RI PC	RI A	RI S
TI-B	-09																	
TI-P	10	36																
TI-C	05	38	44															
TI-Q	28	37	50	25														
TII-C	38	-02	10	02	17													
TII-I	36	11	20	17	25	67												
TIII-RC	37	14	18	18	28	32	30											
TIII-RI	35	09	16	12	17	23	26	45										
TIII-PC	34	08	09	-01	23	26	18	43	36									
TIII-PI	34	08	18	10	31	30	27	43	36	62								
RI-S	15	12	20	09	20	13	17	18	14	13	15							
RI-Cse	29	12	22	04	31	32	34	39	26	26	25	27						
RI-Cl	44	14	31	14	27	36	40	38	34	27	35	35	45					
RI-Co	44	15	17	09	31	31	35	26	30	32	29	29	32	42				
RI-PC	34	19	23	13	31	36	37	31	32	27	28	26	46	56	45			
RI-A	43	07	30	11	37	32	33	29	24	27	31	32	37	47	51	48		
RI-Su	39	11	26	10	25	35	28	31	24	21	24	27	39	48	48	49	46	
RII-S	37	14	25	04	27	43	44	25	28	22	20	30	43	44	46	42	42	44
RII-Cse	25	14	22	06	30	36	37	23	23	22	25	30	43	39	37	40	41	36
RII-Cl	35	17	21	11	31	34	36	21	29	29	28	24	37	46	37	36	30	42
RII-Co	36	19	24	06	31	38	38	25	22	22	21	27	37	48	37	40	35	41
RII-PC	33	28	31	15	30	45	42	37	36	35	35	24	39	42	39	46	39	42
RII-A	43	14	28	09	27	45	41	28	29	29	25	27	42	51	35	43	43	39
RII-Su	33	14	20	13	27	41	39	28	22	24	29	25	41	41	36	47	40	38
RIII-S	46	15	23	18	31	27	34	20	22	25	19	17	34	33	42	38	41	39
RIII-Cse	41	13	16	18	29	29	39	25	33	18	23	25	31	42	40	45	42	33
RIII-Cl	38	16	22	18	30	20	30	22	26	20	10	23	37	36	40	42	41	35
RIII-Co	52	11	26	24	31	39	39	28	21	25	25	29	29	48	55	41	51	53
RIII-PC	52	12	26	13	25	38	43	31	30	28	28	29	31	43	42	36	36	41
RIII-A	37	14	22	18	21	27	37	19	27	08	21	29	26	35	37	31	36	33
RIII-Su	33	23	29	18	35	31	36	28	23	20	23	24	31	37	41	30	37	41
RIV-S	43	14	20	16	27	29	26	26	23	24	22	14	27	36	33	38	34	33
RIV-Cse	38	08	15	00	21	27	27	28	24	33	24	10	35	34	35	35	29	32
RIV-Cl	41	23	26	20	36	22	26	38	33	27	26	20	32	32	27	28	36	33
RIV-Co	36	17	24	19	24	33	28	10	23	17	20	23	27	40	27	36	37	34
RIV-PC	20	05	16	04	24	13	10	18	09	22	15	17	29	14	15	22	22	14
RIV-A	36	10	24	22	29	27	32	27	19	26	25	16	32	42	30	36	32	26
RIV-Su	36	07	19	10	15	34	29	19	27	19	18	25	33	36	31	36	42	28

* Decimals have been omitted.

TABLE 8

Intercorrelations of WISTTRA Subtests for Grade 12 Females*

	RII S	RII Cse	RII Cl	RII Co	RII PC	RII A	RII Su	RIII S	RIII Cse	RIII Cl	RIII Co	RIII PC	RIII A	RIII Su	RIV S	RIV Cse	RIV Cl	RIV Co	RIV PC	RIV A
TI-B																				
TI-P																				
TI-C																				
TI-Q																				
TII-C																				
TII-I																				
TIII-RC																				
TIII-RI																				
TIII-PC																				
TIII-PI																				
RI-S																				
RI-Cse																				
RI-Cl																				
RI-Co																				
RI-PC																				
RI-A																				
RI-Su																				
RII-S																				
RII-Cse	61																			
RII-Cl	54	54																		
RII-Co	65	60	59																	
RII-PC	57	56	53	65																
RII-A	65	58	62	62	63															
RII-Su	53	49	49	56	54	58														
RIII-S	43	37	40	41	44	47	32													
RIII-Cse	39	31	33	40	38	41	31	45												
RIII-Cl	46	33	38	41	40	43	36	48	38											
RIII-Co	42	42	40	41	34	43	37	60	31	41										
RIII-PC	49	37	44	43	56	51	37	46	41	50	47									
RIII-A	50	37	36	43	42	44	39	34	38	43	35	48								
RIII-Su	41	34	34	38	39	43	37	40	37	36	44	43	39							
RIV-S	31	30	36	36	43	41	35	43	33	39	40	43	37	31						
RIV-Cse	34	32	39	40	38	39	32	36	40	39	30	38	30	23	45					
RIV-Cl	38	30	37	31	39	42	34	34	25	33	36	29	24	35	24	26				
RIV-Co	40	35	36	38	39	42	31	30	38	39	44	39	37	30	44	28	21			
RIV-PC	24	20	25	22	26	22	25	12	21	22	12	20	20	23	20	22	18	22		
RIV-A	38	38	43	33	33	38	32	38	29	27	37	26	28	29	29	33	29	27	20	
RIV-Su	26	31	35	27	31	35	26	27	31	31	34	30	25	25	29	26	28	35	22	29

Table 9
Number of Initial and Derived Factors for Males and Females in Grades 8, 10, and 12

	Initial Solution	Initial Factors						Derived Orthogonal Factors: Common[a]						Derived Orthogonal Factors: Specific[b]						Derived Orthogonal Factors: Null[c]						Derived Oblique Factors: Common[a]						Derived Oblique Factors: Specific[b]						Derived Oblique Factors: Null[c]					
Grade		8		10		12		8		10		12		8		10		12		8		10		12		8		10		12		8		10		12		8		10		12	
Sex		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	Alpha	9	10	6	6	10	10	8	9	6	5	9	8	1	1	0	1	1	2	0	0	0	0	0	0	8	9	6	5	9	8	0	0	0	1	0	0	0	0	0	0	0	0
	Harris R-S[2]	23	23	23	23	25	23	9	11	9	8	11	9	8	9	9	8	8	5	6	6	3	6	7	9	8	8	11	8	9	10	9	1	0	1	0	1	0	0	0	0	0	0
	UMLFA	4	7	7	7	7	8	4	7	7	7	6	8	0	0	0	0	1	0	0	0	0	0	0	0	4	7	7	7	6	7	0	0	0	0	0	1	0	0	0	0	0	0

a At least two variables have coefficients greater than .30 (absolute).

b Just one variable has a coefficient greater than .30 (absolute).

c No variable has a coefficient greater than .30 (absolute).

(absolute), and a null factor does not have any coefficients greater than .30 (absolute). The number of factors rotated for the derived oblique solutions was the number of common factors of that derived orthogonal solution.

The factor results for each of the six groups are given in Tables 10 through 15. All of the common factors for each of the six derived solutions are included in the tables; only variables with coefficients greater than .30 (absolute) are used in the interpretation of the factors. The factor results are included in the tables according to the comparable common factors (CCF), those that are robust over solutions, and noncomparable common factors (NCF), those that are not robust over solutions. The comparable common factors are probably the factors that one should pay attention to as being meaningful in the sense that they appear to be reasonably independent of factoring method; they are unlikely to be simply a function of the method used for analyzing the data. For this study the comparable common factors are the ones taken as meaningful factors and are the ones interpreted. In determining the comparable common factors, variables were deemed relevant to a factor if they appeared on that factor for at least four of the six derived solutions. In Tables 10 through 15, capital letters denote the variables deemed relevant to the comparable common factor. The variables in small letters may be noise (?).

Five comparable common factors were obtained for Grade 8 males, six for Grade 8 females and for Grade 10 males and females, and seven for Grade 12 males and females. A comparison of the comparable common factors for the six groups is summarized in Table 16.

CCF 1 consists of the four reject subtests of Testimony I for males and females in Grades 10 and 12. For both males and females in Grade 8 CCF 1 consists of only two of these reject subtests—bias and competence. The accept subtest of Testimony I appears on the same CCF (6) as Reasoning III for all groups except Grade 10 males. For three groups—8M, 8F, and 12M—Reasoning IV is also on CCF 6.

CCF 2 is clearly Testimony II for all groups—for 8th Grade males two other subtests appear with small coefficients.

For Grade 8 males, Grade 8 females, and Grade 10 females CCF 3 consists of Testimony III-Proximity. This CCF includes, with small coefficients, TI-Accept for Grade 8 males and TIII-Recency Consistent for Grade 10 females. CCF 3 may also consist of TIII-Proximity for Grade 12 males; or it may be TIII-Recency and TI-Accept depending upon which common factor for the Harris R-S[2] initial method, both derived orthogonal and oblique solutions, is paired with

Table 10
Factor Results for Grade 8 Males*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	55	61	37	59	70	32
4	TI-COMPETENCE	65	49	33	75	70	
3	TI-Position			36			
5	TI-Qualification			54			40
6	TII-Consistent						-44
8	TIII-Recency Consistent			32			
9	TIII-Recency Inconsistent	32		40		35	
30	RIII-Parallel Case	31		49			38
COMPARABLE COMMON FACTOR 2							
4	TI-COMPETENCE	35		37	31		62
6	TII-CONSISTENT	61	63	68	69	65	65
7	TII-INCONSISTENT	58	62	67	68	60	84
17	RI-ALTERNATIVE	35		32	50	34	
1	TI-Accept			43			49
5	TI-Qualification						44
8	TIII-Recency Consistent			39			54
9	TIII-Recency Inconsistent						34
10	TIII-Proximity Consistent						32
12	RI-Sign				41		
13	RI-Cause			31			46
30	RIII-Parallel Case					-34	
33	RIV-Sign	32		45			66
34	RIV-Cause	36		36			42
36	RIV-Comparative				-32		
37	RIV-Parallel Case			37			60
COMPARABLE COMMON FACTOR 3							
1	TI-ACCEPT	34	36		35	46	
10	TIII-PROXIMITY CONSISTENT	63	61		81	79	
11	TIII-PROXIMITY INCONSISTENT	60	57		73	78	
5	TI-Qualification	36			40	47	
8	TIII-Recency Consistent		32				
COMPARABLE COMMON FACTOR 5							
3	TI-POSITION	40		34	33	56	
19	RII-SIGN	56		53	69	77	62
20	RII-CAUSE	44	35	53	64	35	70
21	RII-CLASS	40		51	52		61
22	RII-COMPARATIVE	60	53	64	70	72	80
23	RII-PARALLEL CASE	49	41	54	51	44	63
24	RII-ALTERNATIVE	53	53	52	59	57	58
25	RII-SUPPORTIVE	34		43	65		52
5	TI-Qualification	38		35		40	
6	TII-Consistent			43			41
7	TII-Inconsistent			40			37
16	RI-Parallel Case			47	52		59
17	RI-Alternative			34			
18	RI-Supportive			43	51		51
26	RIII-Sign	34		32			
29	RIII-Comparative	36		40			
30	RIII-Parallel Case	35		41	43		
31	RIII-Alternative	33		32			

GPO 815-261-7

Table 10 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 6							
1	TI-ACCEPT	43	44	49	37	35	38
9	TIII-RECENCY INCONSISTENT	37	34	40			33
15	RI-COMPARATIVE	53	46	52	73	75	61
26	RIII-SIGN	52	53	55	51	51	56
27	RIII-CAUSE	60	56	58	66	69	80
28	RIII-CLASS	55	64	63	45	56	77
29	RIII-COMPARATIVE	55	59	57	51	58	63
31	RIII-ALTERNATIVE	43	44	49			56
32	RIII-SUPPORTIVE	34	37	35			33
35	RIV-CLASS	47	40	47	58	62	53
36	RIV-COMPARATIVE	33	34	43	34	35	53
38	RIV-ALTERNATIVE	51	53	60	56	61	77
39	RIV-SUPPORTIVE	51	35	44	80	79	55
7	TII-Inconsistent						-43
14	RI-Class	33		32			37
23	RII-Parallel Case			34			
NONCOMPARABLE COMMON FACTOR 9							
12	RI-Sign	34				42	
16	RI-Parallel Case	52	57			72	
18	RI-Supportive	47	53			68	
21	RII-Class					31	
NONCOMPARABLE COMMON FACTOR 10							
1	TI-Accept	37					
8	TIII-Recency Consistent				32		
9	TIII-Recency Inconsistent	34	33		43		
32	RII-Supportive	42			63	45	
33	RIV-Sign	38	54				
36	RIV-Comparative				-33	-36	
37	RIV-Parallel Case	56			61	33	
NONCOMPARABLE COMMON FACTOR 11							
33	RIV-Sign	34			59	65	
34	RIV-Cause				47	45	
36	RIV-Comparative	57			45	39	
37	RIV-Parallel Case				37	51	
38	RIV-Alternative	37					
NONCOMPARABLE COMMON FACTOR 12							
13	RI-Cause				31		
14	RI-Class				-37		
19	RII-Sign		50				
25	RII-Supportive		59		53		
NONCOMPARABLE COMMON FACTOR 13							
3	TI-Position		52				
5	TI-Qualification		45				
19	RII-Sign		32				

* Decimals have been omitted.

Key to Factor Solutions:

I Alpha
II Harris R-S^2
III UMLFA

Table 11
Factor Results for Grade 8 Females*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	44	56	48	54	47	50
4	TI-COMPETENCE	66	50	57	42	50	55
3	TI-Position	49		38			
5	TI-Qualification	31					
COMPARABLE COMMON FACTOR 2							
6	TII-CONSISTENT	77	74	92	90	89	92
7	TII-INCONSISTENT	64	73	59	71	86	59
29	RIII-Comparative	31					
COMPARABLE COMMON FACTOR 3							
10	TIII-PROXIMITY CONSISTENT	44	44	52	47		57
11	TIII-PROXIMITY INCONSISTENT	69	64	51	73	54	56
3	TI-Position			32			37
5	TI-Qualification			40			43
8	TIII-Recency Consistent			37			37
12	RI-Sign				-33		
32	RIII-Supportive				34	57	
COMPARABLE COMMON FACTOR 4							
14	RI-CLASS			42	61	57	48
15	RI-COMPARATIVE	51	41	44	57		50
17	RI-ALTERNATIVE		31	44	66	54	45
18	RI-SUPPORTIVE	42	48	44	49		47
4	TI-Competence				37		
8	TIII-Recency Consistent				36		
12	RI-Sign				34		
13	RI-Cause				65	60	
30	RIII-Parallel Case	42					31
33	RIV-Sign	31					
36	RIV-Comparative					31	
COMPARABLE COMMON FACTOR 5							
16	RI-PARALLEL CASE	32		44	35		48
19	RII-SIGN	44	39	38	38		40
20	RII-CAUSE	53	42	59	69		73
21	RII-CLASS	52	44	44	63		52
22	RII-COMPARATIVE	63	66	53	76	67	60
23	RII-PARALLEL CASE	47	57		39	65	
24	RII-ALTERNATIVE	58	59	41	68	59	47
36	RIV-COMPARATIVE	36	31	39	31		40
9	TIII-Recency Inconsistent			33			
14	RI-Class					-32	
25	RII-Supportive	37	34				

* Decimals have been omitted.

Key to Factor Solutions:

I Alpha
II Harris R-S^2
III UMLFA

GPO 919-251-6

Table 11 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 6							
1	TI-ACCEPT	50	34	58			52
19	RII-SIGN	43	35	45		35	
23	RII-PARALLEL CASE	32	37	31	57	33	
26	RIII-SIGN	54	54	63	48	58	65
28	RIII-CLASS	54	32	59			62
29	RIII-COMPARATIVE	51	33	61			64
31	RIII-ALTERNATIVE	61	51	65	50	59	62
32	RIII-SUPPORTIVE	62	34	51			50
33	RIV-SIGN	59	61	62	92	86	65
34	RIV-CAUSE	45	62	53	61	70	47
35	RIV-CLASS	46	32	53	38	47	50
36	RIV-COMPARATIVE	45	32	48			32
39	RIV-SUPPORTIVE	40	31	41		48	42
3	TI-Position					33	36
6	TII-Consistent						31
8	TIII-Recency Consistent					-34	
9	TIII-Recency Inconsistent	37		40			
11	TIII-Proximity Inconsistent					-34	
12	RI-Sign			31			
13	RI-Cause				-37	-33	
14	RI-Class	33		35		32	
15	RI-Comparative			33			
16	RI-Parallel Case				-38		
20	RII-Cause			31			
21	RII-Class			32			
22	RII-Comparative			35			
25	RII-Supportive			34			
27	RIII-Cause	56		49			53
30	RIII-Parallel Case	31		38	50		
38	RIV-Alternative	44		46			54
NONCOMPARABLE COMMON FACTOR 9							
22	RII-Comparative			38			
23	RII-Parallel Case			83			90
24	RII-Alternative			44			38
33	RIV-Sign			32			
NONCOMPARABLE COMMON FACTOR 10							
1	TI-Accept		32				
8	TIII-Recency Consistent	42	40			46	
9	TIII-Recency Inconsistent	64	62			90	
28	RIII-Class		42			51	
29	RIII-Comparative		34			37	
NONCOMPARABLE COMMON FACTOR 11							
9	TIII-Recency Inconsistent				57		
15	RI-Comparative				-36		
27	RIII-Cause				44		
32	RIII-Supportive				51		
39	RIV-Supportive				32		
NONCOMPARABLE COMMON FACTOR 12							
28	RIII-Class		36				
32	RIII-Supportive		36				
38	RIV-Alternative		55				

Table 11 (Continued)

	Orthogonal			Oblique		
	I	II	III	I	II	III
NONCOMPARABLE COMMON FACTOR 13						
13 RI-Cause	52	56				
17 RI-Alternative	39	31				
NONCOMPARABLE COMMON FACTOR 14						
16 RI-Parallel Case		60			73	
20 RII-Cause		37			52	
NONCOMPARABLE COMMON FACTOR 15						
3 TI-Position		67		73	64	
4 TI-Consistent				50		
5 TI-Qualification		34		52	58	
10 TIII-Proximity Consistent					43	
NONCOMPARABLE COMMON FACTOR 16						
12 RI-Sign				-32		
23 RII-Parallel Case	34			38		
28 RIII-Class				-31		
29 RIII-Comparative				-43		
36 RIV-Comparative					-41	
37 RIV-Parallel Case	51			57	51	
38 RIV-Alternative				-38	-43	
NONCOMPARABLE COMMON FACTOR 17						
8 TIII-Recency Consistent					39	
11 TIII-Proximity Inconsistent					36	
15 RI-Comparative					58	
25 RII-Supportive					32	
30 RIII-Parallel Case					44	

GPO 815-281-6

Table 12
Factor Results for Grade 10 Males*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	43	37	39	46	53	38
3	TI-POSITION	60	64	65	72	71	71
4	TI-COMPETENCE	58	48	50	69	64	50
5	TI-QUALIFICATION	63	64	70	65	71	65
9	TIII-Recency Inconsistent		32	33			
16	RI-Parallel Case		31	34		33	
COMPARABLE COMMON FACTOR 2							
6	TII-CONSISTENT	63	70	89	72	79	107
7	TII-INCONSISTENT	52	69	58	54	82	63
1	TI-Accept	52			54		
8	TIII-Recency Consistent	31					
10	TIII-Proximity Consistent	55			62		
11	TIII-Proximity Inconsistent	58			65		
COMPARABLE COMMON FACTOR 4							
8	TIII-RECENCY CONSISTENT	56	38	62	69		62
9	TIII-RECENCY INCONSISTENT	52	37	52	65		50
12	RI-SIGN	44	44	50	49	55	55
13	RI-CAUSE	56	47	56	75		61
14	RI-CLASS	59	61	59	86	47	71
15	RI-COMPARATIVE	38	41	40	36		36
16	RI-PARALLEL CASE	39	34	42	38		32
17	RI-ALTERNATIVE	48	49	49	57	58	48
18	RI-SUPPORTIVE	48	49	50	55	67	48
10	TIII-Proximity Consistent			42			36
11	TIII-Proximity Inconsistent	33		47			40
22	RII-Comparative			33			
36	RIV-Comparative	33	32	32			
COMPARABLE COMMON FACTOR 5							
19	RII-SIGN	53	58	62	57	74	60
20	RII-CAUSE	52	50	53	61	61	52
21	RII-CLASS	58	58	57	76	73	63
22	RII-COMPARATIVE	63	63	66	77	72	69
23	RII-PARALLEL CASE	69	69	72	86	86	75
24	RII-ALTERNATIVE	54	55	58	60	65	58
25	RII-SUPPORTIVE	53	56	56	63	64	57
32	RIII-SUPPORTIVE	32	34	43		33	36
35	RIV-CLASS	35	35	36	31	32	31
7	TII-Inconsistent	35		34	32		
26	RIII-Sign			35			
27	RIII-Cause	31		39			
29	RIII-Comparative			34			
30	RIII-Parallel Case	31		36			
31	RIII-Alternative	34	32	41			
36	RIV-Comparative			32			
37	RIV-Parallel Case		33	35		35	

* Decimals have been omitted.

Key to Factor Solutions:
I Alpha
II Harris R-S^2
III UMLFA

Table 12 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 6							
26	RIII-SIGN	46	55		62	63	
27	RIII-CAUSE	47	47		60	67	
28	RIII-CLASS	52	51		75	43	
29	RIII-COMPARATIVE	65	71		96	96	
30	RIII-PARALLEL CASE	53	57		72	65	
31	RIII-ALTERNATIVE	40	50		46	63	
32	RIII-SUPPORTIVE	54	46		77	55	
36	RIV-COMPARATIVE	33	38		33	43	
1	TI-Accept	40			49		
COMPARABLE COMMON FACTOR 7							
15	RI-COMPARATIVE	35	32	34		31	
26	RIII-SIGN	42	32	47			46
28	RIII-CLASS	52	47	63	32	55	71
33	RIV-SIGN	58	60	57	68	75	64
34	RIV-CAUSE	61	59	60	64	72	63
36	RIV-COMPARATIVE	35	31	42			35
37	RIV-PARALLEL CASE	35	31	34		37	
38	RIV-ALTERNATIVE	57	53	57	61	54	60
39	RIV-SUPPORTIVE	47	42	53	40	52	59
12	RI-Sign	36		33	32		
16	RI-Parallel Case			31			
17	RI-Alternative	31					
19	RII-Sign	31		33			
29	RIII-Comparative	33		40			35
30	RIII-Parallel Case	34		46			43
31	RIII-Alternative	35		43			38
32	RIII-Supportive				39		
35	RIV-Class			32			
NONCOMPARABLE COMMON FACTOR 9							
26	RIII-Sign			33			37
29	RIII-Comparative			79			98
NONCOMPARABLE COMMON FACTOR 10							
1	TI-Accept		49	60			70
5	TI-Qualification			30			
10	TIII-Proximity Consistent			31			35
11	TIII-Proximity Inconsistent						32
28	RIII-Class			34			31
32	RIII-Supportive		37	39			45
NONCOMPARABLE COMMON FACTOR 11							
1	TI-Accept		33				
8	TIII-Recency Consistent		35				
10	TIII-Proximity Consistent		62			58	
11	TIII-Proximity Inconsistent		63			59	
NONCOMPARABLE COMMON FACTOR 12							
8	TIII-Recency Consistent		38			56	
9	TIII-Recency Inconsistent		53			82	
13	RI-Cause		34			58	
14	RI-Class					33	
21	RII-Class					31	

Table 13
Factor Results for Grade 10 Females*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	32		33	32		38
3	TI-POSITION	53	61	55	60	60	62
4	TI-COMPETENCE	61	52	59	70	59	69
5	TI-QUALIFICATION	60	60	66	60	60	68
COMPARABLE COMMON FACTOR 2							
6	TII-CONSISTENT		61	60		75	79
7	TII-INCONSISTENT		61	62		70	79
COMPARABLE COMMON FACTOR 3							
8	TIII-RECENCY CONSISTENT	39	39	36	39	47	35
10	TIII-PROXIMITY CONSISTENT	73	67	77	76	67	79
11	TIII-PROXIMITY INCONSISTENT	68	67	66	75	68	71
COMPARABLE COMMON FACTOR 4							
12	RI-SIGN	45	57	46	66	76	56
14	RI-CLASS	50	35	51	58	41	55
15	RI-COMPARATIVE	54		55	59	42	75
16	RI-PARALLEL CASE	53	34	48	75	80	66
17	RI-ALTERNATIVE	55		53	68	62	69
18	RI-SUPPORTIVE	45	34	45	46	43	44
33	RIV-SIGN	40		36	43		36
34	RIV-CAUSE	44		45	50		51
35	RIV-CLASS	48		48	72		58
36	RIV-COMPARATIVE	48		50	53		51
39	RIV-SUPPORTIVE	46		45	71		68
1	TI-Accept	33		32			
2	TI-Bias				43		
6	TII-Consistent	39					
7	TII-Inconsistent	46		37			
21	RII-Class	32					
24	RII-Alternative	38		36			
26	RIII-Sign	33					
28	RIII-Class			33			
29	RIII-Comparative	38		38			
30	RIII-Parallel Case	37		35			
38	RIV-Alternative	36		40			41
COMPARABLE COMMON FACTOR 5							
13	RI-CAUSE	45	38	40	46		31
19	RII-SIGN	67	68	68	70	82	75
20	RII-CAUSE	67	67	66	80	73	76
21	RII-CLASS	67	66	65	72	75	70
22	RII-COMPARATIVE	72	74	76	90	59	91
23	RII-PARALLEL CASE	71	74	74	89	50	95
24	RII-ALTERNATIVE	71	73	73	78	82	84
25	RII-SUPPORTIVE	61	60	60	68		63
32	RIII-SUPPORTIVE	53	49	49	54	51	46

(Comparable Common Factor 5 continued on following page)

* Decimals have been omitted.

Key to Factor Solutions:
I Alpha
II Harris R-S^2
III UMLFA

Table 13 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 5 (continued)							
2	TI-Bias					-34	
6	TII-Consistent	46	37	37			
7	TII-Inconsistent	48	41	41			
8	TIII-Recency Consistent					32	
14	RI-Class	34					
15	RI-Comparative		32				
16	RI-Parallel Case	35	39	37			
18	RI-Supportive	36	34	33			
26	RIII-Sign	38	34	36			
27	RIII-Cause	38	34	34			
29	RIII-Comparative	34	33	32			
30	RIII-Parallel Case	42	44	44			
31	RIII-Alternative	35		31			
35	RIV-Class					-36	
37	RIV-Parallel Case	34		32	36		
38	RIV-Alternative					37	
COMPARABLE COMMON FACTOR 6							
1	TI-ACCEPT	55	63	61	87		83
26	RIII-SIGN	50	39	50	69	54	66
27	RIII-CAUSE	35		34	48	33	44
28	RIII-CLASS	49	31	42	68		52
29	RIII-COMPARATIVE	47	44	44	63		54
30	RIII-PARALLEL CASE	32	31	32			31
31	RIII-ALTERNATIVE	44		41	64	39	60
34	RIV-CAUSE	37	40	35	44		42
5	TI-Qualification		31				35
8	TIII-Recency Consistent	32			39		
35	RIV-Class					-40	
37	RIV-Parallel Case						31
38	RIV-Alternative	36			42		
NONCOMPARABLE COMMON FACTOR 9							
2	TI-Bias					32	
8	TIII-Recency Consistent					-33	
22	RII-Comparative					39	
23	RII-Parallel Case					50	
25	RII-Supportive					53	
30	RIII-Parallel Case					37	
35	RIV-Class					42	
37	RIV-Parallel Case					51	
38	RIV-Alternative					-43	
NONCOMPARABLE COMMON FACTOR 10							
1	TI-Accept					59	
8	TIII-Recency Consistent					32	
12	RI-Sign					-31	
28	RIII-Class					69	
29	RIII-Comparative					62	
31	RIII-Alternative					31	
34	RIV-Cause					68	
35	RIV-Class					58	
36	RIV-Comparative					48	
38	RIV-Alternative					54	

Table 13 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
NONCOMPARABLE COMMON FACTOR 11							
8	TIII-Recency Consistent		39				
9	TIII-Recency Inconsistent		48				
NONCOMPARABLE COMMON FACTOR 12							
16	RI-Parallel Case		34				
39	RIV-Supportive		54				
NONCOMPARABLE COMMON FACTOR 13							
1	TI-Accept					-41	-34
2	TI-Bias			51		47	52
31	RIII-Alternative			33			

Table 14
Factor Results for Grade 12 Males*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	67	62	57	68	70	66
3	TI-POSITION	52	55	57	53	58	61
4	TI-COMPETENCE	69	68	69	77	73	89
5	TI-QUALIFICATION	50	48	53	48	38	58
COMPARABLE COMMON FACTOR 2							
6	TII-CONSISTENT	67	73	69	71	90	102
7	TII-INCONSISTENT	70	67	76	67	79	104
10	TIII-Proximity Consistent				-36		
19	RII-Sign	37	31	31			
29	RIII-Comparative				37		
32	RIII-Supportive	37	34				
COMPARABLE COMMON FACTOR 3							
1	TI-ACCEPT	47	35		66	74	
8	TIII-RECENCY CONSISTENT	52	56		79	79	
9	TIII-RECENCY INCONSISTENT	43	31		65	67	
5	TI-Qualification					40	
10	TIII-Proximity Consistent	45			43	37	
11	TIII-Proximity Inconsistent	51			64	64	

* Decimals have been omitted.

Key to Factor Solutions:

I Alpha
II Harris R-S^2
III UMLFA

Table 14 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 4							
12	RI-SIGN	62	60	50			57
14	RI-CLASS	40		62	61	65	77
15	RI-COMPARATIVE	36	33	57	78	66	63
16	RI-PARALLEL CASE	42	36	58	40	56	69
17	RI-ALTERNATIVE	46	36	39			33
18	RI-SUPPORTIVE			49	84	73	50
8	TIII-Recency Consistent			42			43
9	TIII-Recency Inconsistent			31			
10	TIII-Proximity Consistent			50			55
11	TIII-Proximity Inconsistent			47			56
13	RI-Cause			36			33
20	RII-Cause			34			
21	RII-Class			31			
27	RIII-Cause			35			
29	RIII-Comparative				49		
32	RIII-Supportive			38			
COMPARABLE COMMON FACTOR 5							
19	RII-SIGN	59	62	59	65	66	68
20	RII-CAUSE	48	51	48	39	46	46
21	RII-CLASS	59	61	60	76	82	74
22	RII-COMPARATIVE	67	69	67	88	91	94
23	RII-PARALLEL CASE	63	66	66	84	85	84
24	RII-ALTERNATIVE	62	63	63	77	79	75
25	RII-SUPPORTIVE	60	61	59	72	75	70
35	RIV-CLASS	45	43	45	49	35	44
7	TII-Inconsistent	31	34	32			
10	TIII-Proximity Consistent	32			34		
30	RIII-Parallel Case	31	32	31			
COMPARABLE COMMON FACTOR 6							
1	TI-ACCEPT	43	36	55			48
17	RI-ALTERNATIVE	38	34		55	40	37
28	RIII-CLASS	49	37	60			77
29	RIII-COMPARATIVE	45	31	40	36		83
30	RIII-PARALLEL CASE	56	44	56	66	52	84
31	RIII-ALTERNATIVE	51	42	49	49	45	56
33	RIV-SIGN	61	54	52	76	77	52
34	RIV-CAUSE	63	61	67	61	78	62
35	RIV-CLASS	50	43	42	54	52	40
38	RIV-ALTERNATIVE	49	44	55		43	45
39	RIV-SUPPORTIVE	59	63	54	75	84	64
2	TI-Bias						-52
5	TI-Qualification	34		46			48
7	TII-Inconsistent				-41		
9	TIII-Recency Inconsistent			38			
15	RI-Comparative						37
16	RI-Parallel Case					38	
20	RII-Cause			31			
24	RII-Alternative	35		35			
25	RII-Supportive			31			
26	RIII-Sign	51	40	51			
27	RIII-Cause	39	33	38			
32	RIII-Supportive	40	32	36			
36	RIV-Comparative	35		44			32
37	RIV-Parallel Case			32			

Table 14 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 8							
13	RI-CAUSE	45	47	34	61	50	57
26	RIII-SIGN	41	37	59	55		81
32	RIII-SUPPORTIVE		37	40	37		47
37	RIV-PARALLEL CASE	47			70	51	40
2	TI-Bias				31		
15	RI-Comparative						-40
16	RI-Parallel Case					36	
17	RI-Alternative				-35		
27	RIII-Cause	36			51		
28	RIII-Class	37			40		
35	RIV-Class					-37	
NONCOMPARABLE COMMON FACTOR 9							
2	TI-Bias				-35		
28	RIII-Class				33		
36	RIV-Comparative		54		86		
38	RIV-Alternative		40		33		
NONCOMPARABLE COMMON FACTOR 10							
15	RI-Comparative	42				35	
26	RIII-Sign		31				
28	RIII-Class	37	48			63	
29	RIII-Comparative	46	62			87	
30	RIII-Parallel Case		36			41	
NONCOMPARABLE COMMON FACTOR 11							
10	TIII-Proximity Consistent		53				
11	TIII-Proximity Inconsistent		60				
NONCOMPARABLE COMMON FACTOR 12							
10	TIII-Proximity Consistent	35					
12	RI-Sign				68	39	
14	RI-Class	39					
15	RI-Comparative	32	39				
16	RI-Parallel Case	33			31		
17	RI-Alternative				38	34	
18	RI-Supportive	55	59				
32	RIII-Supportive	31					
NONCOMPARABLE COMMON FACTOR 13							
10	TIII-Proximity Consistent					50	
26	RII-Sign					55	
32	RIII-Supportive					63	

Table 15
Factor Results for Grade 12 Females*

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 1							
2	TI-BIAS	61	62	62	68	65	62
3	TI-POSITION	62	62	63	68	67	61
4	TI-COMPETENCE	65	62	65	74	70	67
5	TI-QUALIFICATION	51	48	48	54	50	44
COMPARABLE COMMON FACTOR 2							
6	TII-CONSISTENT	71	68	91	66	79	100
7	TII-INCONSISTENT	64	66	56	58	81	60
29	RIII-Comparative						-45
COMPARABLE COMMON FACTOR 3							
8	TIII-RECENCY CONSISTENT	54	50	54	68	53	51
9	TIII-RECENCY INCONSISTENT	43	43	43	52	44	40
10	TIII-PROXIMITY CONSISTENT	75	72	77	74	78	77
11	TIII-PROXIMITY INCONSISTENT	72	71	72	70	77	74
1	TI-Accept	31		33			
COMPARABLE COMMON FACTOR 4							
12	RI-SIGN	46		35	48	60	38
13	RI-CAUSE		40	46	62		51
14	RI-CLASS	42	48	50	50	46	53
15	RI-COMPARATIVE	44		40		65	39
16	RI-PARALLEL CASE	35	52	57	61	43	66
17	RI-ALTERNATIVE	53	31	54	62	63	60
18	RI-SUPPORTIVE	43	40	43		66	44
27	RIII-Cause			35			
29	RIII-Comparative	48				50	
36	RIV-Comparative				39		
37	RIV-Parallel Case				57		
39	RIV-Supportive			35	62		37
COMPARABLE COMMON FACTOR 5							
19	RII-SIGN	70	69	68	79	69	64
20	RII-CAUSE	66	67	68	77	85	76
21	RII-CLASS	61	62	61	66	78	64
22	RII-COMPARATIVE	74	73	72	86	85	76
23	RII-PARALLEL CASE	65	65	62	67	61	58
24	RII-ALTERNATIVE	68	69	66	71	73	63
25	RII-SUPPORTIVE	57	57	55	59	59	53
4	TI-Competence				-32		
6	TII-Consistent	33	31				
7	TII-Inconsistent	31					
13	RI-Cause	35	32	33			
14	RI-Class	33	32				
16	RI-Parallel Case	31					
18	RI-Supportive	32					
26	RIII-Sign	31	31				
28	RIII-Class	31					
30	RIII-Parallel Case	37	35	33			
31	RIII-Alternative	37	37	34			
34	RIV-Cause	32					

GPO 815-881-4

Table 15 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
COMPARABLE COMMON FACTOR 6							
1	TI-ACCEPT	62	46	42		65	44
26	RIII-SIGN	64	58	42		80	
27	RIII-CAUSE	39		38	40		33
28	RIII-CLASS	49	35	42	42	33	38
30	RIII-PARALLEL CASE	45	36	34	63		60
9	TIII-Recency Inconsistent				46		
12	RI-Sign					-32	
15	RI-Comparative	40	52				
17	RI-Alternative	34	44				
18	RI-Supportive	33	45				
29	RIII-Comparative	56	69			57	
31	RIII-Alternative	32			64		60
32	RIII-Supportive	31	38				37
33	RIV-Sign	49		57		31	
34	RIV-Cause	44		51		32	
35	RIV-Class					38	
36	RIV-Comparative	32		36	33		
38	RIV-Alternative				-33	38	
COMPARABLE COMMON FACTOR 8							
30	RIII-PARALLEL CASE	32	36	46		55	
31	RIII-ALTERNATIVE	33	45	47		49	
1	TI-Accept			33			
23	RII-Parallel Case					31	
28	RIII-Class			32			
38	RIV-Alternative					-40	
NONCOMPARABLE COMMON FACTOR 9							
13	RI-Cause	35					
14	RI-Class	34					
16	RI-Parallel Case	47					
NONCOMPARABLE COMMON FACTOR 10							
1	TI-Accept				47		
12	RI-Sign				-46		
26	RIII-Sign				48		35
33	RIV-Sign		46		57		61
34	RIV-Cause		48		56		52
38	RIV-Alternative				34		
NONCOMPARABLE COMMON FACTOR 11							
8	TIII-Recency Consistent		35				
35	RIV-Class		45				
NONCOMPARABLE COMMON FACTOR 12							
14	RI-Class					32	
33	RIV-Sign					39	
36	RIV-Comparative					55	
39	RIV-Supportive					32	

Table 15 (Continued)

		Orthogonal			Oblique		
		I	II	III	I	II	III
NONCOMPARABLE COMMON FACTOR 13							
1	TI-Accept				36		
15	RI-Comparative				59		
17	RI-Alternative				42		
18	RI-Supportive				53		
26	RIII-Sign			38	55		
29	RIII-Comparative			86	90		
37	RIV-Parallel Case				-39		
NONCOMPARABLE COMMON FACTOR 14							
13	RI-Cause					53	
16	RI-Parallel Case					37	
27	RIII-Cause					46	
28	RIII-Class					35	
29	RIII-Comparative					-41	
34	RIV-Cause					39	
37	RIV-Parallel Case					40	

* Decimals have been omitted.

Key to Factor Solutions:

I Alpha
II Harris R-S^2
III UMLFA

Table 16

A Comparison of the Comparable Common Factors for the Six Groups

CCF	Grade 8 Males	Grade 8 Females	Grade 10 Males	Grade 10 Females	Grade 12 Males	Grade 12 Females
1	TI-B, C	TI-B, C	TI-Reject	TI-Reject	TI-Reject	TI-Reject
2	TII TI-C RI-A	TII	TII	TII	TII	TII
3	TIII-P TI-A	TIII-P		TIII-P TIII-RC	TIII-R TI-A or TIII-P	TIII-R and P
4		RI-CL, Co, A, Su	RI TIII-R	RI(except Cse) RIV(except PC and A)	RI(except Cse)	RI
5	RII TI-P	RII(except Su) RI-PC RIV-Co	RII RIII-Su RIV-Cl	RII RIII-Su RI-Cse	RII RIV-CL	RII
6	RIII(except PC) RIV-Cl, Co, A, Su TI-A RI-Co TIII-RI	RIII(except Cse and PC) RIV(except PC and A) TI-A RII-S, PC	RIII RIV-Co	RIII(except Su) TI-A RIV-Cse	RIII-Cl, Co, PC, A RIV(except Co and PC) TI-A RI-A	RIII-S, Cse, Cl, PC TI-A
7			RIV(except Cl) RI-Co RIII-S and Cl			
8					RI-Cse RIII-S and Su RIV-PC	RIII-PC, A

this common factor for the other solutions. For this method TIII split into two factors—one for Recency and one for Proximity. For the other solutions these two appeared on the same factor. The table includes the Recency factor with the others as CCF 3 since those coefficients were slightly higher. This was an arbitrary decision and thus CCF 3 for Grade 12 males could be either TIII-P or TIII-R and TI-A. Both the recency and proximity subtests of TIII appear on CCF 3 for Grade 12 females.

CCF 4 is composed of essentially Reasoning I for all groups except eighth grade males for which RI does not appear on any CCF. For Grade 10 males CCF 4 also includes TIII-Recency and for Grade 10 females it also includes Reasoning IV except for two of the subtests.

All of the subtests of Reasoning II appear on CCF 5 for all of the groups except for the supportive subtest for Grade 8 females. For all except Grade 12 females, one or two other subtests appear on this comparable common factor with small coefficients.

CCF 6 is essentially Reasoning III. It is the clearest for Grade 10 males. This is the only group for which all of the subtests appear on the CCF and it includes only one other subtest with small coefficients. Reasoning IV, though not all subtests, is included on CCF 6 with RIII for Grade 8 males and females, and Grade 12 males. Testimony I-Accept is also included on CCF 6 for all groups except Grade 10 males. In addition, for all groups except Grade 12 females, one or two other subtests are included with small coefficients.

Reasoning IV appears as a separate comparable common factor for just one group, Grade 10 males. This is CCF 7.

Grade 12 males and females each have one other comparable common factor with just a few variables. These are not very clear as to interpretation and appear on the tables as CCF 8.

Thus, looking at the comparable common factors across the six groups studied, there tends to be seven interpretable comparable common factors. In general these represent Testimony I-Reject, Testimony II, Testimony III-Proximity, Reasoning I, Reasoning II, Reasoning III, and Reasoning IV. This indicates that verbal argument, as studied here, tends to be structured according to the types of tests used to assess testimony and according to the argument component hypotheses for reasoning.

The subtests that were included as measures of these hypothesized testimony factors were: TI-Accept; TI-Reject consisting of four subtests: Bias, Position, Competence, and Qualification; TII-Consistent and Inconsistent; TIII-Recency Consistent and Recency Inconsistent; and TIII-Proximity Consistent and Proximity Inconsistent. The hypothesized argument component factors for reasoning were measured by: Warrant, Reasoning I; Reservation, Reasoning III; Reservation Answer, Reasoning II; and Claim, Reasoning IV. Each one of these reasoning tests was composed of seven subtests according to warrant type.

The results are not clear for three of these hypothesized factors: Testimony I-Accept, Testimony III-Recency, and Reasoning IV. For five of the groups TI-Accept appears on CCF 6 with RIII and, in some cases, RIV. In addition, for Grade 12 males it appears with TIII-R and for Grade 8 males it appears on CCF 3 with TIII-P with small coefficients. This lack of clarity may be due to the fact that only one subtest was included to measure this hypothesized factor. Thus it may be that it was not strong enough to be a specific factor and was "pulled" onto a factor with something else. This is somewhat upheld by the results for Grade 10 males. For this group TI-A essentially got "lost"; it does not appear on any comparable common factor and not as a specific factor except for one solution, Harris R-S^2 oblique. It appears as a noncomparable factor having coefficients for three solutions, Harris R-S^2 orthogonal and UMLFA orthogonal and oblique. Further study would be necessary to determine if this were the case or if Testimony I-Accept is clearly related to Reasoning III.

The second unclear hypothesized factor, Testimony III-Recency, appears clearly with TIII-P for Grade 12 females and somewhat for Grade 12 males (for some of the solutions) and for Grade 10 females (one of the subtests with small coefficients). TIII-R is on the same factor as RI for Grade 10 males and appears with small coefficients with RIII for Grade 8 males. It does not appear on any comparable common factor for Grade 8 females. Thus, it seems that as verbal argument skills are developed, from Grade 8 through Grade 12, TIII-R becomes more and more related to TIII-P.

The other unclear hypothesized factor is Reasoning IV. For one group it appears as a separate comparable common factor, CCF 7 for Grade 10 males. For Grade 10 females it appears with RI. For Grade 8 males and females and Grade 12 males it appears with RIII. RIV does not appear on any CCF for Grade 12 females. Thus, RIV may be related to RI or RIII, or it may be measuring an ability that is at least somewhat different. There are other indications that RIV may be a different ability in some of the noncomparable common factors.

The intercorrelations of the comparable common factors are given in Tables 17 through 19.

Table 17
Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 8*

CCF		Males					Females				
		1	2	3	4	5	1	2	3	4	5
2	I	45					-21				
	II	44					09				
	III	33					-07				
3	I	49	66				-13	33			
	II	63	58				05	42			
	III						30	-17			
4	I						-19	61	43		
	II						07	57	42		
	III						19	-07	37		
5	I	51	72	67			-27	56	43	72	
	II	62	58	70			-02	54	43	58	
	III	39	79				23	-24	47	55	
6	I	52	71	66		74	-30	60	44	73	74
	II	63	58	73		75	06	64	54	66	67
	III	38	80			78	-25	-13	48	60	67

Table 18
Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 10*

CCF		Males						Females				
		1	2	3	4	5	6	1	2	3	4	5
2	I	54						41				
	II	53						53				
	III	14										
3	I							32				
	II							28	42			
	III							33	40			
4	I	62	69					58		51		
	II	58	57					49	74	44		
	III	43	22					61	75	47		
5	I	53	64		72			49		44	81	
	II	54	64		67			44	70	37	77	
	III	33	29		59			53	72	39	79	
6	I	59	59		68	79		61		46	86	80
	II	60	57		63	78		37	58	27	60	64
	III							60	71	37	81	75
7	I	52	47		66	66	74					
	II	55	49		65	69	78					
	III	37	37		53	58						

* Decimals have been omitted.

Key to initial factor solutions:
I Alpha
II Harris R-S^2
III UMLFA

Table 19

Intercorrelations of the Comparable Common Factors for the Oblique Solutions for Grade 12*

CCF		Males						Females					
		1	2	3	4	5	6	1	2	3	4	5	6
2	I	37						18					
	II	39						26					
	III	60						07					
3	I	49	64					36	31				
	II	54	70					27	51				
	III							16	17				
4	I	54	60	78				51	40	58			
	II	52	59	73				46	62	51			
	III	60	72					27	36	43			
5	I	49	66	76	78			47	40	47	77		
	II	52	73	77	72			42	65	50	71		
	III	59	77		74			25	27	35	61		
6	I	49	66	67	75	78		50	41	44	76	72	
	II	50	66	78	69	79		42	60	51	77	70	
	III	62	77		74	80		27	21	32	60	64	
8	I	47	62	74	75	78	79						
	II	43	58	67	60	66	70	38	56	40	62	70	69
	III	54	74		69	77	82						

* Decimals have been omitted.

Key to initial factor solutions:

I Alpha
II Harris R-S[2]
III UMLFA

They are included together for each of the three initial methods for easier comparison. The CCFs for the reasoning tests (CCF 4 - CCF 7) are fairly highly intercorrelated. The CCFs for the testimony tests (CCF 1- CCF 3) tend to have moderate correlations with the reasoning factors and are more highly correlated with the reasoning factors than they are with the other testimony comparable common factors.

The factor structure is quite similar for both males and females in Grades 10 and 12 and it seems to be more clear for these groups than it is for 8th Grade subjects. This would lend further support to the conclusion reached by Rott, Feezel, Allen, and Harris (1969) that during the 10th Grade seems to be a good time to teach the concepts and abilities related to verbal argument.

IV
CONCLUSIONS

The major conclusion is that the tests based upon the taxonomy of concepts and abiliti : related to verbal argument as proposed by Allen, Feezel, and Kauffeld (1967) have construct validity at a particular level of specificity. The abilities underlying the assessment of verbal argument related to ordinary discourse seem to be the abilities to assess testimony in terms of internal (accept and reject) and external (consistency, recency, and proximity) tests of testimony, and the abilities to evaluate arguments developed through reasoning in terms of selecting the proper argument components of warrant, reservation, reservation answer, and claim. The type of warrant used in the argument seemed not to be of importance in terms of the underlying abilities represented by the comparable common factors. In teaching, however, one might still wish to make this distinction and use examples of reasoning for all of the types of warrants.

All of the testimony subtests and most of the reasoning subtests were sufficiently reliable for research purposes.

The obtained factor structure, in terms of the comparable common factors, is quite similar for all groups studied but seems to be more clear for Grades 10 and 12 than it is for Grade 8.

It seems that, based upon the clarity of the comparable common factors, Grade 10 would be a good time to teach these concepts and abilities related to verbal argument as used in ordinary discourse.

The reasoning comparable common factors are fairly highly intercorrelated. The testimony comparable common factors are moderately correlated with the reasoning factors. The intercorrelations of the testimony factors tend to be low to moderate.

GPO 919-261-3

REFERENCES

Allen, R. R., Feezel, Jerry D., & Kauffeld, F. J. A taxonomy of concepts and critical abilities related to the evaluation of verbal arguments. Occasional Paper Number 9. Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin, Madison, August, 1967.

Allen, R. R., Feezel, Jerry D., & Kauffeld, F. J. The Wisconsin tests of testimony and reasoning assessment (WISTTRA). Practical Paper Number 6. Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin, Madison, January, 1969.

Allen, R. R., Feezel, Jerry D., Kauffeld, F. J., & Harris, Margaret L. The development of the Wisconsin tests of testimony and reasoning assessment (WISTTRA). Technical Report Number 80. Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin, Madison, Wisconsin, April, 1969.

Harris, Chester W. Some Rao-Guttman relationships. Psychometrika, 1962, 27, 247-263.

Harris, Chester W. On factors and factor scores. Psychometrika, 1967, 32, 363-379.

Harris, Chester W. & Kaiser, Henry F. Oblique factor analytic solutions by orthogonal transformations. Psychometrika, 1964, 29, 347-362.

Harris, Margaret L. & Harris, Chester W. A factor analytic interpretation strategy. Technical Report. Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin, Madison, in progress.

Jöreskog, Karl G. Some contributions to maximum liklihood factor analysis. Psychometrika, 1967, 32, 443-482.

Kaiser, Henry F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.

Kaiser, Henry F. & Caffrey, John. Alpha factor analysis. Psychometrika, 1965, 30, 1-14.

Miller, Donald M., et al. Multivariate procedures for stratifying school districts. Laboratory of Instructional Research, The University of Wisconsin, Madison, 1967.

Rott, Robert W., Feezel, Jerry D., Allen, R. R., & Harris, Margaret L. Student abilities in the evaluation of verbal argument. Technical Report. Wisconsin Research and Development Center for Cognitive Learning. The University of Wisconsin, Madison, in progress.

GPO 815-861-2